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Royal Academy Pictures.

FEW will doubt that the two central pictures of the year are Mr. Leighton's "Daphnephoria" (241), and Mr. Poynter's "Atalanta's Race" (943); and thus, after a considerable preponderance of the scale in favour of subjects of romantic or pathetic feeling for some three or four years past, we are this year brought back again to neo-Greek art and ideal classic figures. Mr. Leighton's picture, indeed, is one of the most thoroughly Pagan or pre-Christian works we have ever seen in modern painting. In front of a thick grove of trees, which occupy a great part of the canvas (and which, by the way, are not quite so fresh and living in tone as we should desire to see them) come the members of the procession held every ninth year at Thebes, in commemoration of a victory over a rival city, and in honour of Apollo, to whom it was owing. First marches a youth with a dark purple scarf round his loins, carrying a great golden symbol of the sun, followed by the priest of Apollo, in full raiment, carrying laurel-branches; then some naked youths carrying martial trophies, then the figures who compose the bulk of the procession, the female singers, young girls and women in flowing robes girt beneath the bosom, forming with their various tones a beautiful harmony of delicately contrasted colour: the whole of this bevy of Greek beauties, of a very full-blown type, are in full song, their lips wide apart to give breath to the hymn led by the harp-player in front, who turns back a moment to give them fresh encouragement. In the distance below is seen the town of Thebes, bright in the sunshine. Nothing could be more harmonious and delightful to the eye than the assemblage of colour, nothing more perfect than the delineation of some of the figures,—for example, the youth with his back to the spectator in the front group; nothing more gay, light-hearted, sensuous, more utterly devoid of the sentiment we now call religious, than the whole group who pass along the marble pavement, besprinkled with laurel-branches. But stay,—what is that thin, melancholy face in the background, belonging to a bystander, who, with his head leaned on his hand, watches the gay group of women with a sad, thoughtful expression? The figure may easily be missed, but its presence, whether intentionally or not on the part of the artist, makes all the difference in the feeling of the work.

Mr. Poynter's "Atalanta" is a picture on a larger scale and in a very different manner. The scene is the marble-paved "public place," with the base of a temple forming the background, on the steps and between the pillars of which an eager crowd of on-lookers are cheering and encouraging the racing suitor, who has just thrown the second of the golden apples, and half turns his head as he runs to see the result. Atalanta has stopped herself suddenly, with the left foot planted sideways across her course, and stoops, with open hand, to pick up the tempting toy. The double action of the figure, checked suddenly in her career, and yet with the onward impetus still apparent, is admirably given, as well as the foreshortening of the body in one of the most difficult of positions; but is not Atalanta very exceptionally tall? The height to which the figure would rise if she stood upright it is almost alarming to reckon up. Milanion is a grand figure in the full strength of manhood. He scarcely seems, however, to be putting forth his full power or running his fastest; indeed, the excitement and intensity of interest seem confined to the spectators, most of whom are evidently in favour of the suitor, and already flourish palms and garlands in the air in anticipation of his victory. The anxiety, again, of one or two who are of Atalanta's party, their indignant impatience at her apparent folly in stopping, are expressed in an equally lively manner. These groups, however, are quite in the background, and the attention is chiefly demanded by the two principal figures, which, whether quite attaining the ideal of the supposed action or not, have qualities that must add to the artist's reputation with artists; while the whole is evidently the principal centre of attraction with the general body of visitors. By the way, it is rather absurd to refer the story in the catalogue to Morris's "Earthly Paradise," as if the legend of Atalanta were no older than Mr. Morris. Another point we may remark on is that, as the legend is an old one of pre-historic Greece, the architecture should have been Early Doric. The bases of the columns belong to a late Greek style.

From Greek to Roman our next glance takes us, and we are still treading on marble in Mr. Alma Tadema's picture of the "Audience at Agrippa's" (249), and the best painted marble of the three; for Mr. Tadema has served his apprenticeship with marble very thoroughly. But in every sense this, though small, is one of the most remarkable works the artist has produced. He makes us live the Roman life over again; the men and women who go up and down the palace steps and along the colonnade which stretches from us, the officials or under-secretaries at the table at the entrance, become realities to us; we can fancy what their life and ideas and tempers may have been, can realise something of the distinction between their life and ours, instead of regarding them merely as models dressed up in togas. This faculty of revivifying Roman society could only result from long and persevering study of all the records and remains which give us the clue to this life of a past age, and enable the artist by degrees to live it over again. A picture by the same artist which will have many admirers is that of a Bacchante who has flung herself down, "After the Dance" (927), in apparently somewhat vinous slumber, her thyrsus with its bright ribbon thrown beside her, her form relieved against the dark skin of some animal which forms her couch. There is a remarkable flush and voluptuous languor about the whole thing quite in keeping with the subject, and giving it an individuality of character quite beyond that of a mere nude study. This can hardly be said of Mr. Armitage's "Phryne" (909), on the opposite side of the same room. Apelles, we are reminded in a note, painted his "Venus Anadyomene" after he had seen Phryne bathing on the seashore. Passing over the question whether he had any business to see Phryne under the circumstances (which can hardly be decided now), it is evident that Apelles, like a true artist, turned this prosaic circumstance to a poetic account, and idealised Phryne into Venus. Mr. Armitage prefers to paint merely Phryne. It would have been more to the purpose, since the Venus Anadyomene has perished, and is but a tradition, if the modern painter had aimed at restoring the ideal of Apelles. As it is, we have merely a well-painted but not very beautiful body, with nothing either spiritual or *spirituel* about it. We do not care for Phryne; she might have made her toilet undisturbed for us. No doubt her flesh is remarkably like flesh; has been worked up with the most realistic finish; but,—*cui bono?*

Going to No. 1 Gallery, we notice first the able work of Mr. Eyre Crowe, again, it may be observed, a Greek subject, "The Rehearsal" of the "Birds" of Aristophanes, representing the scene where the two visitors from Athens are taken for bird-catchers and repelled with violent gestures by the actor whose assumed gesticulation and rage contrast amusingly with the cool critical look of the poet sitting by, manuscript in hand, to correct the performance where necessary. In the background are seen the Chorus with birds' masks and wings, the humour of their appearance being further intensified by the introduction of the raven which sits on the curtain-pole, apparently puzzled and inquisitive at the doings of his human imitators. The picture is a success in every way; more so than the same artist's "Darning-day at the Red Maids' School, Bristol" (146), which is not so successful in the interest of the figures as some other works of Mr. Crowe's in the same style; and the building occupies so large a portion of the picture that its detail should have been more finished. Mr. Goodall's large picture "An Intruder on the Bedouins' Pasture" (14) does not interest us much, and illustrates his tendency to canvasses larger than his subject at all demands; we turn with more pleasure to his smaller work "Sheep-washing near the Pyramids of Geezeh" (585), which is very bright and atmospheric in effect; its excellences belong, however, rather to landscape, which just now we are postponing. Mr. Prinsep's "À Bientôt" (31) is a great improvement on his "Minuet" of last year; a young man in green dress bows over the hand of a young lady in white, who is just about to ascend a staircase; the action and expression of the two

figures are full of character, old-fashioned gallantry on the one part, and stately but not unkind demeanour on the other; the combination of colour is very bright and pleasant to the eye. Of two social subjects, or pictures with a moral, in the same gallery, we can make nothing of Mr. Macbeth's "Lincolnshire Gang" (46), which does not tell its story even with the help of the long note appended in the catalogue; Mr. Barnard's "Saturday Night" (62), the other work referred to, is a street scene obvious enough in its point and intention, and contains a good deal that is both humorous and true to nature, with a clever treatment of effects of artificial lighting, but a tone and manner in colouring which to our eyes is most repelling, not to say coarse. A small work by Mr. S. Lucas, the interior of an "upper room" where sits a poor youth who has been "fleeced" (19) at play over night is very good; all the incidents aid the story—the cold early morning sky, the empty punch-bowl, the wasted candle, as well as the figure of the luckless victim with his head bowed on the table. "For the King and the Cause" (1,333), by the same artist, depicting the results of a single combat in which a Royalist has fallen by the hand of a "Parliament man," is a work of considerable interest.

Mr. Hodgson has rather changed his ground this year, scarcely to immediate advantage, though one is always glad to see a good artist desirous to avoid remaining in one groove. Instead of his street and shop scenes of African life, he has selected subjects in which his able treatment of Algerian figures can be combined, more or less, with landscape. His "Temple of Diana at Zaghouan" (84) includes a humorous repetition of the story of Actæon, represented by an English sportsman, who, coming down to the stream with his dog, disturbs a dusky Diana up to her knees in the water, the centre of a group of amateur washerwomen; her nearest companion endeavours, laughingly, to screen her too much uncovered bust. In "Following the Plough" (301), we have a single man driving a bullock-team in a plough, followed, in his turn, by sundry storks, who seem desirous to make the best of anything the ploughshare may turn up. In both these there is of course a good deal to admire; but it would be incorrect to say that they are equal in vivacity or interest to the works the artist has sent for two or three years back; still, the new vein thus opened may lead to more. Mr. Waller humorously illustrates "The Way of the World" (90) somewhat in Mr. Orchardson's vein, by the fate of an unfortunate delinquent placed in the stocks, and become the object of hissing to a flock of geese. Mr. Marks is hardly at his best in his illustration of "Journeys end in lovers meeting," where he depicts landscape more fully than is his wont, with very bright and fresh treatment of the foreground detail; but the figures have not much of interest. "The Apothecary" (156: he of "Romeo and Juliet") gives him an opportunity for that brilliant and studied delineation of odds and ends which he has made very successful lately; and here the figure is not, to our thinking, the best, or at least the most important part of the sum total of oddities. Mr. P. R. Morris has taken a leaf out of Mr. Boughton's book in "Sigh no more, Ladies" (126), a pretty but somewhat weak painting; but he has made a genuine success on somewhat new ground, in his interesting and pleasing picture of "The Sailor's Wedding" (280), where the wedding party struggle against a strong breeze along the margin of a boisterous sea; the characters have been studied and portrayed with true insight and sympathy: the sturdy sailor a (capital specimen of his class), the bride, a pretty and refined-looking young woman, though with an appearance quite in keeping with her supposed position in life; the "best man" and his cheerful-looking companion; the little bridesmaid whose hat blows off, and the weather-beaten old couple bringing up the rear, form a group with whom we at once feel the kindly sympathy which the artist must have felt when he painted them; for it is a pleasant feature in Mr. Morris's best works that he always has something for our feeling as well as our mere judgment to take interest in. The sea is not the strongest part of the work perhaps; but it will bear comparison with all but the work of our one or two specially gifted sea-painters. The success and progress of Mr. Morris in his art has been rapid and genuine, and gives promise of more to come. In all that makes the art best worth having, how far superior is such a work as this to Tissot's "On the Thames" (113), where the cleverest and most realistic finish is bestowed on the delineation of that odious type of dressy vapid girl who seems to be the only style of London young lady whom the French painter finds worthy of his brush. Let us be thankful that there is more even in the "fashionable" London girl than Mr. Tissot shows us.

We may mention, in Gallery II., the best work yet sent by Mr. J. N. Waterhouse, who appears to be a steadily advancing artist; "After the Dance" (91), contains a good deal of excellent work, and the artist is partially escaping from the mannerism of tone in his draperies, &c., which threatened to be a stumbling-block in his way. Mrs. Ward's "Visit of Mrs. Fry to Newgate" (170) will appeal to the sympathies of many; the disorderly scene in the court-yard is, perhaps, scarcely so vividly shown or so prominent in the picture as the quotation appended would lead us to expect, but it is terrible enough. It is a picture with an excellent purpose.

Going on to Gallery III., we hold up the hands of dismay before a representation of "Dinner-time at Penshurst, in 1665," by a painter who writes R.A. ("if they do these things in the green tree," &c.), and turn the eyes of amusement and interest to Mr. Cope's picture of the Council of the Academy (160), and their assistants, engaged in the task of selecting pictures for the exhibition. This is a spirited and well-painted picture, containing some very good portraits. From the note appended, describing the *modus operandi*, we take this to be, however, a kind of *ad captandum* appeal for favour on behalf of an institution which has been much reviled. It will scarcely silence all objectors, however, if, for instance, it be true, as we have heard, that on the present occasion the Council have performed the feat of rejecting two important landscapes by an artist who is incapable of painting anything which the Academy could have a right to reject on the question of merit. When one considers this, and looks at some things that are on the walls, one cannot but feel indignant. The Academy have driven away Legros; they have now probably driven away another artist whose works are an honour to any exhibition: we mean Mr. Alfred W. Hunt, one of the few artists, by the way, of whom we know nothing personally.

Mr. Leslie takes us back to good old days, in the title of his principal work, "My Duty towards my Neighbour" (169), which seems to be a puzzle to the young lady who is attempting to repeat it to her fair instructress; a very fine, curly-haired lad, in a rather picturesque dress, listens critically behind. The little child is rather wooden and inexpressive in face, otherwise the picture is in the artist's best mood, and likely to be a general favourite. Mr. Poole's "Meeting of Oberon and Titania" (175) is not a fortunate specimen of his powers; the fairy figures are drawn with a curious carelessness about form; the effect of light on Oberon and his queen is unhappily suggestive of lime-light turned on them from the side-scenes. Mr. Lewis's two Cairo pictures (187, 222) exhibit his usual brilliant characteristics in colour and detail, but (whether intentionally or not) without the brightness and glitter of reflected light with which he has so often astonished our eyes; we are not mentioning this as a defect, but only as a slight change in manner which may or may not have its reason. The Cairo auctioneer we consider the best work, or, at least, the most complete and pointed in grouping and effect; in the larger one it is doubtful, by the way, whether the court-yard and horses, figures, &c., below the level of the principal part of the picture, really keep their distance; to our eyes there is a little confusion of aërial perspective here. Mr. Calderon's best contribution is "The Nest" (192), searched for amid its bower of green leaves by a young woman, while a little, bright-haired child, with his back to us, looks earnestly on; the glitter on the grass and daisies repeats the effect shown in "Great Sport" in a previous year. Mr. Yeames is clever, though not quite telling his story, in "The Last Bit of Scandal" (233), a return from a rout in early morning, in the sedan-chair time; and Mr. Pettie (to step to a very opposite subject) sends a life-size repetition of the braggart warrior we saw before in "Terms to the besieged" (259); the subject was worth neither the labour nor the canvas. The artist is shown to much more advantage in the "Step" (433) executed by a little girl for the amusement of one of the most kindly and venerable of grand-mothers. Mr. Albert Moore sends one little work, "Beads" (258), so dainty in colour and execution as to make us wish there were more subject in it, and then that we had half a dozen instead of one. But it is undeniable that Mr. Moore repeats himself too much.

Mr. Frith's contributions attract a good deal of attention from the majority of visitors; his scene from the "Vicar of Wakefield" (250), where young Squire Thornhill, on his first visit, is setting the little boys to box, is humorous and bright in regard to the attitudes and expressions of the two lads, one of whom is full of fun and mischief; we cannot recognise Squire Thornhill in the round-faced young man behind them, nor can we believe poor Mrs. Primrose, blockhead as she was, to have been so outrageously vulgar as the artist represents her. "Below the Doge's Palace, 1,460" (350) represents the attempt of an imprisoned woman to attract the compassion of a monk whom she addresses through the grated window.

Mr. G. A. Storey is hardly at his best in "My Lady Belle" (265), which, in fact, has not enough of interest for the size of the canvas, and would have told better as a half or quarter size figure: "The Dancing Lesson" (121) is the class of work which has won the artist his position. Mr. Orchardson is at his best, or more than his best, this year; his works exhibit the peculiar humour and the originality of tone and treatment which have usually marked them, and he has taken more trouble to fill up his backgrounds with details that add effect and interest to the whole, instead of the bare mass of floor or wall which we too often find covering the larger part of the canvas; in every respect "The Bill of Sale" (264) and "The Old Soldier" (892), are calculated to better his reputation. There is pathos in Mr. F. Holl's sad funeral procession of "Her First-born" (286), but a pathos which somehow does not impress us as very real, or as anything more than an effort after effect on the part of the artist. Mr. Riviere gives a good study of ducks, under the title, "A Stern Chase is always a Long Chase" (313), and ditto of dogs (496), the herdman's dogs in the "Odyssey," alarmed at the approach of Pallas Athene. We share the dismay of the dogs, and wish the artist would let goddesses alone. Mr. Wallis has left this year the Venetian subjects in which he has recently displayed such brilliant ability, and scarcely gives us anything of compensating excellence and interest. There is something new and original in "Outside a Prison in Southern Italy" (322), where a girl plays a violin to the listeners through a grated window; but the interest is certainly in the incident rather than in its treatment; and we can hardly see that the artist's other works this year are up to the standard which he previously reached. A good many small works of merit we must necessarily pass over. Mr. Millais's group of children, two of whom have come to see another who is "Getting Better" (387), is admirable in character, the lad especially; to his more important works we must return hereafter. Not far from this is the largest work of Mr. Prinsep, "Linen Gatherers" (411), belonging to a class of subjects which this artist has recently taken up, and which seems to us to owe its original inspiration to Mason. This represents girls coming down by groups or singly from the high downs with the linen that has been bleaching there; the subject and intention of the work arouse one's sympathy, but we scarcely feel that the painter has given us the whole of it; his own sympathy with it seems to be imperfect, and the feeling which is aimed at is not reached: in execution the figures are excellent, the tones of the landscape rather conventional. Mr. Hennessey's "En Fête, Normandy," continues with some brilliancy of treatment the class of work with which his name has been associated for a year or two back; the picture is hard, but not uninteresting. We may contrast this picture of Normandy peasant life, on its bright side, with Mr. Aumonier's beautiful and thoughtful work, "Toilers of the Field" (207), in which a band of rustics go forth to their work by the margin of a wide shallow stream, and through a landscape with a quiet melancholy pervading it, which harmonises with the subject in a way that is suggestive of not a little reflection. This, however, is pushed up on high, while Mr. Hennessey's far more prosaic work is on the line; a contrast not creditable to the judgment and feeling of somebody.

Two comparatively young painters are represented by works which, for their ambition in scale and aim, challenge the attention of every visitor. Mr. Long's "Bethesda" (891) will not

injure the reputation he acquired by his brilliant effort last year; but perhaps will hardly enhance it. A good deal of the success of the work lies in its effectiveness rather than in any deeper feeling. The reflection of the group in the stagnant water, the appearance of utter stagnation conveyed by the bubbles which stand on the surface, and the feather which lies, hardly wet, upon the water, are sure to strike every one. The figures themselves are admirably drawn, arranged,—everything of that sort,—but they do not impress us with any great sympathy, any strong realisation of the longing for relief which is intended to be expressed. The work is that of a painter whose executive ability is at present in advance of his mental conception. A much deeper, truer pathos is embodied in Mr. Fildes's almost heart-rending work, "The Widower" (476). We may say at once that we think the painting would have produced equal effect, and been more satisfactory to the judgment, had it been half the scale. In painting such a subject life-size an amount of space and trouble has to be devoted to the depiction in detail of objects which hardly help the total effect, and which, as far as they bear upon it, could be equally well represented on a smaller scale. Look at the grand and pathetic effects which Israels produces, for instance, in treating the same class of subject on quite a small scale. Apart from this, Mr. Fildes's picture is an unmistakable success. The interest is centred on the figure of a poor "navvy," his boots still covered with the clay of his day-labour, seated in his home with a sick child in his arms, at whom he gazes with a look of helpless affection, not knowing what to do with the poor motherless thing. The eldest daughter, about fifteen, looks on with a face almost haggard with fruitless sympathy and anxiety; the little ones kick about the floor and amuse themselves as they please, unconscious of the domestic tragedy that is going on. Perhaps we may question the desirability of too often bringing forward this tearful side of human life in painting; may doubt whether there is not a sacred character in such grief which scarcely bears dragging to the light. We make no complaint of it in the present instance, however, in consideration of the genuine feeling with which the subject is treated, saddening as the effect of the picture is.

Among other figure subjects, we may mention Mr. Boughton's "A Surrey Pastoral" (562), in which, however, the figures do not at all remind us of anything we know of in English peasant life; Mr. Dixon's "Miles from Home" (522), a police-station interior, where a very small child is seated on a bench waiting while her case is considered by the guardians of the public peace (there is a good deal of character in this work); "Seaside Enjoyment" (974), by Mr. Ormsby, a new name in the Academy, whose work has a good deal of quiet humour; Mr. Croft's "Morning of the Battle of Waterloo" (1,253) on the French side, the men rousing themselves from their bivouac, one or two yawning, only half awake, while in the back-ground, at a table, sits that figure in the grey coat and cocked hat which will be remembered for ever in history; this is a very good battle-scene, with a good deal of reality about it; there is M. Philippoteaux's "Charge of the Heavy Cavalry at Balaclava" (1,332) also, very disappointing to those who remember his admirable picture last year; and Mr. Marcus Stone's "Appeal for Mercy" (1,326), made by a hapless "aristocrat" lady to a couple of members of the Committee of Safety; but this, to say truth, misses its mark, and scarcely interests our feelings. We are glad to see one of the students' paintings of this year, "Elijah, Ahab, and Jezebel" (1,253) hung, one which it was thought by many deserved a prize rather than "the honourable mention" it received, and which is, perhaps, hung here as a compensation.

"Sharpening a Skate, Friesland" (586), by Mr. Bisschop (whose name, though honourably known elsewhere, is new at the Academy), is an interesting and able work which might well have claimed a better position: a young lady in fur cap and blue-sleeved dress waits while her skate is ground by the man whose help-mate turns the grindstone, the two figures strongly relieved against a white wall in full light. The colour is harmonious, the style broad and forcible, but with sufficient attention to detail in every part.

Of the portraits of this year, that by Mr. Millais, of the Duchess of Westminster (329), must in one sense rank as the most important. It is certainly one of the richest in effect, and of the most highly-finished and powerful works of the class, in regard to the painting of the rich and elaborate accessories, that have been seen in the Academy; but it hardly belongs to the order of portraiture in which the intellectual interest is predominant. This praise may rather be given to the same artist's portrait of Lord Lytton (240), a three-quarter length of a tall, thin, erect figure, every inch the diplomatist and the gentleman, and in the pose of which, though exceedingly simple and unaffected, there is a great deal of character. The companion portrait, in size and scale, of Mrs. Schlesinger (248), is a great favourite with visitors; but here, again, attention is compelled rather to the remarkably successful painting of the blue velvet dress than to the countenance. Mr. Ouless has not quite come up to the standard of his last year's performance, but his portrait of Mr. Bouverie (77) is a notable specimen of force and originality in the treatment of a head, as regards both colour and expression. In his larger portraits of Baron Amphlett and Sir A. Milne (425, 445) the artist has had the difficulty, as in one sense it is, of dealing with official costumes of a power and brightness of colour which must always tend to compete too much with the countenance, if realistically represented. The aim at bringing the whole into harmony has been more successful perhaps with the uniform of the admiral than with the scarlet robes of the judge. Mr. Leighton's head of Captain Richard F. Burton, "Her Majesty's Consul at Trieste" (128), is doubly interesting as a most forcibly-treated likeness of a very characteristic head, and as representing the artist in a manner so unlike what we usually connect with his name, the character and associations of his sitter having apparently drawn him for a moment aside from his Greek and Southern sympathies of style and feeling. Mr. G. F. Watts's three works have not the striking character of some which he has given us, but there is very refined expression and drawing in the portrait "The Bishop of Ely" (181), great breadth of treatment in that of Mr. Macnamara, "The Surgeon to the Westminster Hospital" (1,275), while the small picture called "By the Sea, a Study" (161), which we may class with the portraits, a quarter-length of a young girl in a straw hat holding a shell, about which she seems to address some inquiry as she turns her sweet blue eyes up to you, is one of the most tenderly painted things in the exhibition, both in its delicate harmony of colour and in the expression of the face, which has quite a story written in it. In strong contrast to this are the portraits by Mr. Pettie and Mr. Orchardson, of whom the former has taken to painting figures in the costumes of different periods, of which No. 886 is a clever but very theatrical specimen; while Mr. Orchardson makes a hit, certainly, in a way, by his portrait of a girl with unkempt hair in a coarse blueish dress with a yellow-clad doll in her lap, a picture which fidgets and annoys one at the same time that its cleverness and a certain force in it are undeniable. Then Mr. Boughton paints "Master Graham Pettie in the Costume of the Seventeenth Century" (34), with which the young gentleman looks rather discontented, and Mr. Richmond paints "Miss Charlotte H. Richmond" (373) in a singularly ungainly costume, but with considerable richness and refinement of colour. Mr. R. Herdman sends a characteristic and powerfully-painted head of "Thomas Carlyle," Mr. Richmond a rather hardly-painted likeness of "The Hon. Miss Labouchere" (1,277), in a Japanese style of dress which is more striking than beautiful; and M. Fantin, of floral fame, interests every one more or less by coming out as a portrait-painter in a very highly-finished, straightforward, matter-of-fact portrait of "Mr. and Mrs. Edwin Edwards" (86), the general tone of which is anything but agreeable, though it attests strongly the manipulative power so strikingly shown by the artist in a very different class of subject. Altogether there is no lack of originality and variety in the portraits of the year, with a too great prevalence of attempt at effect rather than repose and expression, even on the part of such a generally "repose-ful" painter as Mr. Sant (whom we were almost forgetting), whose likeness of Mdlle. Thalberg seems to us a trifle theatrical; but, on the other hand, his likeness of the Misses Siemens (197) is, though not altogether perfect in colour, thoroughly natural and refined, and the countenance of the younger (?) lady very happily and expressively given.

Mr. Hook's best works are among those of which one cannot say whether the figures or the scenery (one cannot exactly say landscape) are of the most interest and excellence, and this is emphatically the case with his principal work this year, "Crabbers" (234), which is one of the old out-at-sea subjects, representing a boat pulled by one man, a capital specimen of the best style of south-coast fisherman, while his mate assists a gigantic crab through the narrow opening of the basket. Perhaps what strikes one most of all in this work is the remarkable manner in which the motion of the boat over the water is realised, in a way that could only result from long and close observation,—the double motion, the spring upward and sideways from the stroke of the sea, and the "send" of the boat forward from the oar at the same instant, are so real that one almost seems to be on board of the craft. Needless to add, how fresh and "open-air" are the tone and swing of the water. The rest of the artist's contributions are in a quieter vein; but in "Seaside Ducks" (44) and "Hard Lines" (498) one is struck by an exquisite refinement in the tones of the grey sea (less blue than is usual with the painter) and the varied lights on the green folds and breaks of the cliffs. Whilst on sea subjects let us also dispose of the large sea-picture of the year, Mr. H. Moore's coast scene, under the title "A Lifeboat" (455), one of those white, wrathful seas of his which one hears hissing and roaring as one contemplates the canvas, though we have to allow, nevertheless, for the painter's own way of looking at the matter, for this is not the real tone and colour of sea water; Mr. Moore concentrates his efforts on giving us its sound and motion, and he has power enough to compel us for the moment to look with his eyes, and see the sea thus and in no other way: let us give all honour to the artist's peculiar power, while we recognise its limitation. A seaside piece of Mr. Orchardson's, "Flotsam and Jetsam" (208), where a worn gaunt-looking woman, her garments blowing wildly in the wind, hauls up some piece of spoil out of the waves, should be looked at, the rather as such a subject is a new effort with this artist; there is a melancholy desolation about it which is impressive.

Among landscapes properly so called, no doubt but that "Over the Hills and Far Away," by Mr. Millais (106), is the central work of the year, so far as great ability and conscientious workmanship can render it so. As in most of the artist's previous landscapes, an elaborate study of foreground detail is what makes the most effective portion of the picture; but in this case the distance has more tenderness and sentiment, and to our thinking more truth of effect than in previous works, while the foreground, for richness of tone and brilliancy of laboured detail, outdoes every former effort. The scene is a Scotch moorland in a hilly district; the half-swampy nature of the ground, with its partial pools and knots of rushes, is so real that we can fancy it soaking under our feet; the perspective of the ground where the dip hides it from further view is complete; the dark hill on the left just getting into the light at the foot where it joins the plain is very beautifully given; the distance and expanse of the sunlit plain, small as is the space it covers on the canvas, is remarkable. The picture is one which grows upon the eye, and of which all the excellence is not apprehended at the first glance, though its basis is that of materialism rather than sentiment, no doubt.

We hazarded a hope last year that Mr. Brett would not be tempted to repeat too often the triumph of sea-painting in bright calm, which had formed his *pièce de résistance* for two or three years. We have our wish, and like many other people in such a case are not as content as we ought to be. In one of his large works this year, "Sir Thomas's Tower" (532), the artist is still on his beloved sea-shore, with flat spits of sand and ripples of shallow water, but this time we are looking from the shore coastwards, to a mighty barrier of piled-up crag, with attendant rocks in the foreground: the latter are painted with the artist's usual force and realism; somehow the mass of crag behind does not impress us; it seems neither one thing nor the other, neither strikingly realistic nor strikingly picturesque,—neither Brett nor Turner, but something between the two. The other scene, entitled with a half-playful vagueness, "A certain Trout Stream" (365), has more of the artist's peculiar power: this is a scene in the glare of the hottest summer-day; the foliage is almost startling in its vivid and bright tones; in the foreground are some of those moss and lichen-covered boulders which Mr. Brett paints *con amore*, and equally successful is the look of the brown fore-ground water, with its peculiar

"wobble" just below the small cataract; filling up the distance are hills in a haze of heat, with ultramarine shadows: this last bit of the painting puzzles the judgment, and comes nearer to looking like a cooked effect than anything we have seen lately from this artist. Nevertheless, this is a painting of power and force, and we cannot but recognise the artist's wisdom in shaking himself free from the temptation to repeat one successful effect *ad infinitum*, which is such a besetting sin with many who have once found such an effect.

After these works we may look round the landscapes in order of numbering, noting first that the two pictures by Mr. Oakes are not equal to what might once have been expected of that artist in virtue of the truthful and conscientious character of some earlier works; both these (6 and 36) are more or less mannered and painted for the popular eye; the strong light on the bank in the first is a pretty well-worn receipt of the artist's, and the dark shadow on the left in the latter has no reasonable or sufficient explanation save to throw out with an artificial brilliancy the lights on the sea. This is not, with whatever merits, a style of painting to see on the line. Mr. Linnell, sen., shows his usual merits and his usual effect in "The Hollow Tree" (51); it is a testimony to the real truth and artistic sentiment of the veteran artist's one landscape effect, that one can bear to see it so often without being really tired of it. Mr. Macallum's "Shearing Wraick in the Sound of Harris" (98: *N.B.*—What is "wraick," and where is the Sound of Harris?) savours rather of manner too, but may be true to local colour. The landscapes of Mr. H. W. B. Davis are of those which daily-paper critics are much taken with, and are popular with general spectators, nor do we say they should not be; they are very solidly painted, and "Early Summer" (168) is a fine view over a grandly-timbered park, the cool dark green of the foreground in shadow very pleasant to the eye. "The Rustling Leaves" (550) has similar merits, and very successful realism of tone and surface in the foreground; but our mind's ear does not hear the leaves rustle; in both pictures the foliage seems too hard and metallic for that. In short, these are good pictures in a conventional style. A landscape by Mr. Wells (not a very common event), "Harvest Weather: Afternoon on Holmbury Hill" (281), has what many landscapes here want, a distinct speciality of composition and motive; perhaps it will not bear looking into very much (indeed, it is out of reach in that way), but there is something in it. Then we come to Mr. Vicat Cole, whose large landscape, "The Day's Decline" (308), belongs intellectually to the same class of work as those of Mr. Davis, though more completely, perhaps, answering its aim: as a piece of picture-making this is very successful, and has more refinement of feeling than we sometimes see in works of this class; moreover, the materials are admirably put together to produce a pleasingly-grouped composition. Mr. MacWhinter's "Spindrift" (427: a glossary should really be appended to the catalogue) is a scene on that same solitary, bleak, sea-dyke road where some sheep got "Astray" last year, and along which now a horse and cart make their way; this is a satisfactory picture made out of a simple subject, the unity of effect and feeling in it impress us more than some more ambitious works. Mr. Hemy's "Red Autumn" (440) is in the more subtle beauties of landscape-painting one of the best to be seen here; a brown, shallow stream in the foreground, a dank bank and hedge to the left, and filling up the distance, over the tree-tops, a hill with pervading reddish tints against a coldly gleaming sunlight behind; there is a great deal of feeling in this picture, which grows upon the attentive observer. Above it Mr. Leader, in his "English Hayfield" (441), exhibits a degree of freshness of open-air effect, under a bright though cloudy sky, which is an agreeable change from his usually artificial and mechanical style.

In the next room we meet with two works dealing with specialties of subject. Mr. Poingdestre's "Marble Quarries at Carrara" (460) seems to us just to fail from want of sufficient vividness in colour; the dull greyish tone which pervades it may be true, but does not make a very successful picture. Beneath hangs a small work by Mr. Aumonier, "Water-lilies" (462), which is very original in subject and treatment, and one of the most delicate and charming pieces of colour in the exhibition. The calm stream with the water-lilies forms the foreground, the varied green tones of the broad leaves half in and half out of the water, with the white blossoms, form a delicious combination of tints; two swans in the stream continue to heighten the cool, pure effect; a level field beyond, with a hay-cart loading, and belts of trees in the rear of it, complete this very charming and poetic work. In strongest possible contrast is Mr. Farquharson's thoughtful work, "The Crofter's Team" (471), a horse and an ox harnessed to the same plough, and pulling heavily through the stiff clay which gives the prevailing tone to the scene in the uncertain light of late evening. "A Scotch Hill-side" (483), by Mr. Fisher, is a landscape of no little power, very real in the foreground (a steep bank in high light), very fine in the dark half-purple half-green mass of hill on the other side of the ravine: the author of this ought to do something in landscape. We must not pass over Mr. Edward Fahey's "He never Came," a picture which represents a desolate-looking nook, with a half-green stagnant pool, backed by thick clumps of trees, and a ruinous old house to the right; the figure of a girl waits in the foreground. At first sight this is a very effective picture, with a distinct aim pervading it, but a want of attention to local colour is apparent: the trees are a nondescript green, and the building a nondescript grey, and clever and effective as the work is, it is a "made" effect. Mr. MacWhirter's "Lady of the Woods" (511) is a bright and charming study of a birch-tree in full sunlight. Mr. Peter Graham combines a capitally-executed study of Highland cattle, with a portentous rain-storm effect, in "Moorland Rovers" (885), but he is not doing what was once hoped for from him. Mr. Richmond's large and extraordinary painting, "Near Via Reggio, where Shelley's Body was Found" (945), is either very good or very bad: it is an extraordinary effect, and we cannot say that it is not real; it is at least painted with no little force.

Some remarks on this year's sculpture we defer.

BYLAND ABBEY.

AN effort is being made to remove the rubbish beneath which the ruins of this abbey are covered, and the consent of the owner of the remains having been obtained, an examination of the site has been made by Mr. E. Sharpe, of Lancaster, who has advised as to the best means of carrying out the object in view. The Yorkshire Archæological Association has taken the matter in hand, and an appeal is being made for funds to enable them to do for Byland what has already been done by their owners to the ruins of Fountains Abbey and Jervaulx Abbey.

Byland Abbey—"Bella Landa"—lies in a broad valley about two miles north-east of the village of Coxwold, in Yorkshire, and eight miles east of Thirsk.

"It was," says a report by Mr. Sharpe, "an affiliation of Furness. Its early history was written by Philip, the third abbot, in the year 1197, in the second year of his abbacy; this history is given entire by Dugdale in his notice of Byland Abbey ('Monasticon,' vol. v., p. 349; No. VII.); but although it gives an interesting account of the troubles and wanderings of the twelve Furness monks with their principal, who colonised Byland, and whose names are all handed down in this chronicle, it is only indirectly that we derive from it any knowledge of the year in which the Abbey Church, the magnificence of which is attested by the remains that still exist, was commenced. It appears that the colony left Furness in the year 1134: that they first went to Calder; but driven out there, they fled into Yorkshire, where they were hospitably entertained by the mother of Roger de Mowbray, who became ultimately their chief benefactor; and settled them first at a place called Hood, in the parish of Hokingham, where they remained four years; afterwards at Byland-on-the-Moor; or Old Byland,—four miles north of the former place; and subsequently at a place called Stockyng, where, Abbot Philip tells us, they built a stone church, a cloister, and other edifices. They remained there thirty years, during which time their possessions so greatly increased that they determined to commence on a fresh site, which had previously been given to them by Sir Thomas de Colvil, a church that should surpass in size and in its general character all existing churches of the order, with conventual buildings on a proportionate scale.

That this church was not commenced until some time after the year 1150, when Roger de Mowbray obtained from Roger, Bishop of York, the promise to take the abbey under his protection, on its freedom from the persecution and claims of the abbots of Furness and Stockyng, is obvious from Abbot Philip's detailed account of the pains taken by the monks subsequent to this date to clear off timber and to drain the land where they intended to place their new convent. That it must have been commenced and advanced to the point which enabled them to hold their services in it before A.D. 1177, is also certain from the fact, that, on the 31st of October in that year the monks migrated from Stockyng to the new site, which is very accurately described in Abbot Philip's account as lying between Whiteker and the foot of the mountain of Cambe, close to Burtoft and Berselyva. That it was, moreover, finished, so far as the structure itself was concerned, before 1197, the year in which Abbot Philip wrote, is also evident from the terms in which he refers to it."

The date of the abbey is probably 1170; but it is not possible to fix this with any accuracy. Great interest, however, attaches to the circumstance that it is probably the first of the Cistercian churches in which the pointed arch occurs.

The ruins are at present covered, at least the lower parts, beneath heaps of earth and rubbish. Mr. Sharpe, having obtained the sanction of Major Stapylton, the owner, proposes that these heaps should be systematically examined; the rubbish being carted away to an adjoining available vacant spot, and careful search made for relics of the ancient ornamentation of the abbey. It is more than probable that sufficient portions may be recovered to enable a general idea of the internal decoration of the edifice to be obtained. It is to be hoped that sufficient funds will be forthcoming to enable the scheme to be fairly carried out.

SOME NEW SKATING RINKS.

Chelsea.—On the 29th ult. a real ice skating-rink, called the Glaciarium, was opened at the Old Clock House, Chelsea. The rink has been designed by Mr. John Gamgee, who says that it was in the course of experiments on the production of artificial cold for the preservation of meat that the process occurred to him by means of which he would now engage to put down twelve square miles of ice. Mr. Gamgee simply condenses sulphurous acid under pressure. This on being released produces intense cold, which is transmitted to a tank filled with uncongealable liquid—glycerine and water. The liquid, rendered much cooler than the ice, circulates through pipes laid on the floor of the rink, and covered with two or three inches of water. The intense cold of the liquid passing through the pipes keeps the water constantly frozen, and the result is a perfect sheet of ice, on which Mr. Gamgee would guarantee good skating even under a Bombay sun.

Bradford.—The "Bradford Roller Skating Company" are erecting a new rink in Valley-parade,—a new road immediately opposite the Volunteer Barracks, in Manningham-lane. The skating surface will be 200 ft. in length and upwards of 80 ft. in width, and will be formed of the "Limmer" asphalte. Only a portion of this surface,—140 ft. by 50 ft.,—will be covered, access to the uncovered portion being given by folding doors at the end of the building. The contract for the building is in the hands of Messrs. Taylor & Parsons. The excavators' and masons' work has been let to Mr. Albert Chandler. The whole of the works are being carried out from designs prepared by Mr. T. Sington, architect, Manchester. The entire cost of the land and building will be about 7,000*l.*

Bridlington Quay.—The promenade skating-rink, erected for Mr. J. M. Wilson at a cost of upwards of 2,000*l.*, has been opened to the public. The building is of brick, with cement front and slated dome roof, and top lights. There are raised seats around the building, a gallery at one end, and an orchestra at the other, so that it will be easily converted into a concert or ball room. The building was designed by Mr. Earnshaw, architect, and the work has been carried out by Mr. W. Moody, builder.

Wimbledon.—The Hill-side Skating-rink, recently opened, occupies a site between the Wimbledon College and the Swan Hotel. It is laid with concrete by Messrs. Greene & King, of New Bond-street, and is 150 ft. long by 55 ft. broad. The rink is open, but it is proposed to erect a smaller rink, covered in for use in the winter or in wet weather, should the present one prove a success.

THE PLANES OF LIFE AND OF MOVEMENT IN LONDON.

THE investigation into which we have recently entered as to the diminished activity of the work of the builder in London leads naturally to the consideration of the various efforts that have been made, or that are now proposed, for the increase of the lodging capacity of the metropolis, by multiplying the number of horizontal planes on which human beings either dwell or move from place to place. In point of fact, and apart from any theoretic views, a very great change in this respect is in course of operation. We may, indeed, carry back the commencement of this change to the unknown period when the simple hut of the dweller by the banks of the Thames was replaced by a slightly less rude building, furnished with a loft, used for the purpose of rest or of store. And as to the different planes of movement, we may date their origin from the time when a rude wooden bridge was first stretched athwart the watery highway which formed the primary High-street of London. In later times we may trace a fresh impulse in this respect, leaving its traces not only in the erection of successive bridges, each more convenient or more stately than its predecessor, but, still more notably, in the descent to that yet lower route which the genius and perseverance of Sir Mark Brunel bored under the bed of the river. No lion of London used so much to excite the wonder and admiration of foreign visitors as did that costly engineering work on its first completion. Following on the opening of the Thames Tunnel, the extension of the London and Birmingham Railway next made necessary the scientific solution of important questions of relative planes of movement. As the crossing of streets and highways on the level by the locomotive was from the first regarded as inadmissible, the prolongation of the London and Birmingham line from the terminus provided by the first Act of Parliament passed for its authorisation to Euston-square demanded great and mature consideration. The Regent's Canal had to be crossed, leaving a height below the railway bridge sufficient to allow of the uninterrupted passage of the barges. This involved the construction of an iron bridge, designed by Sir Charles, then Mr. Charles, Fox, under the direction of Mr. Robert Stephenson, the elegance and mechanical beauty of which marked a new era in our iron structures. Within a distance so short as to necessitate the use of an incline dropping at the rate of 1 ft. in a chain, the great metropolitan thoroughfares of Park-street and the Hampstead-road had to be passed under. For these viaducts a new design was also adopted, consisting of square pillars, supporting cast-iron girders across the railway, with brick arches in cement turned from girder to girder. The level to which the railway was thus depressed, notwithstanding the raising, by a few inches, of the Hampstead-road, ran so closely to that of the sewers of the district, that a special survey of their structures was required, and some reconstruction of sewers had to be carried out before the line was finally brought nearly to the level of the roadway north of Euston-square. Almost all the difficulties which have been experienced by later engineers in the construction of the great works which now pierce and cross London had to be considered, at least in principle, by the engineers of this pioneer railway; not forgetting the tunnel through the London clay that forms the once rural knoll of Primrose-hill. No fluviatile bridge has encountered the difficulties that failed to appal the engineers of the Thames Tunnel. No plan has exceeded in simple fitness for conveying a great traffic in an entirely novel manner that of what was called, in 1834, the Euston Extension of the London and Birmingham Railway.

The Greenwich Line, with its long row of brick arches, which presented the first sketch of the viaduct proper through London, may be referred to the year 1835; Colonel Landmann, in that year, being the engineer of the line. Thus it is now fully forty years since the first essays at those great engineering works which have done so much to render London accessible to the country and to the suburban residents were made. Very much has been added to the costly nature of the work since that time. The great improvements in the manufacture of iron have enabled later engineers to substitute hideous beams, of low cost, and great merit of contrivance as to strength, although strikingly deficient in any architectural merit, for such graceful structures as Fox's Regent's Canal Bridge. The Metropolitan Railway has followed Mr. Stephenson's plan of making open cut galleries or trenches, lining them with brickwork, and then filling in the earth around the arch; thus combining a section very like that of the London and Birmingham tunnels, with a mode of execution such as that which was adopted for the Park-street and Hampstead-road galleries. But in all these matters there has only been a development, however costly, and however well designed, of the principles that were introduced, and successfully applied, on the one hand by Sir Mark Brunel, and on the other hand by Mr. Robert Stephenson and his assistants, in the first third of the present century.

It was on another feature of the railway system that Isambard Brunel, the son of Sir Mark, impressed the stamp of his taste as well as of his genius. Hitherto we have regarded only the work of the engineer. Architecture, strictly speaking, was not represented on our early railways. When an architect was consulted, as in the case of the Euston station, it was for some isolated feature of the works, which thus often presented an incongruous contrast with the purely engineering structures beside which they were placed. Thus the original Euston station presented only the development by Mr. Stephenson of two ideas: those of shed-roof and of platform. Iron was adopted for the roof, but rather as a cheap and fire-proof material than as an architectural material properly so called. The Euston roofs were very cheap. Iron and slate were put together in the simplest form, with the sole addition of glass skylights, so as to cover an adequate space at the least possible cost per square. And by way of architectural adornment, the large portal reared by Mr. Hardwick stood for a long time as much out of its proper element as a fish out of water. It had no relationship to the engineering arrangements of the station. It had no connexion with roof or platform, or even with carriage approach. It was a huge symbol, of which the due significance has only lately become manifest. For many years it might have been pointed at as a signal and costly proof that architecture was an art unrequired by the busy commerce of the day, and only involving a waste of money from the economic point of view. It is only within the past few years that the good taste of Mr. Hardwick has been justified, and that we have obtained a clear proof that a noble architectural feature, however incongruous it may at first appear, has only to be allowed fair play in order to produce the effect intended by its designer. Penned in by the station buildings, the great portal of Euston station long looked like a gigantic mistake; but with the vista recently opened, the great gateway obtained the association that was needful to bring out the meaning of the design. No less than the statue of the able and honourable man that stands before it, it may now claim to be considered among the chief monuments and ornaments of London.

Isambard Brunel, however, was the first to show us that architecture and engineering were twin sisters, and that they were more admirable in harmony than apart. His own cultivated taste, and his knowledge of Continental art, especially of Italian styles, enabled him to give to his stations the new feature of the verandah roof. To this he added at Swindon a style of decoration then very rare in England, and produced an arrangement somewhat superior in its convenience, and incomparably superior in its effect, to the iron shed-roofs of his friend and rival, Stephenson. For many years the Great Western Station at Paddington was merely a mass of temporary wooden sheds,—much like one of those that still hold a place at Reading. The reason of this delay was the fact that Paddington was only regarded, at first, as a temporary station. The Great Western and the North-Western lines approach very near to one another at Wormwood Scrubs. It was at one time intended to effect a junction at this point; and in obtaining powers for the Euston-square Extension, before referred to, the London and North-Western Railway provided for the purchase of enough land to bring the Great Western traffic alongside of their own to the Euston terminus. It is probably to the advantage of the public that this arrangement fell through. The gauge question, so far as memory serves us, was the great bone of contention. At all events by the time that the working drawings of the Euston Extension were prepared, in the winter of 1835-6, Mr. Stephenson only provided for the accommodation of four lines of 4 ft. 8½ in. gauge way from Camden-town to the Euston terminus.

More than one project for the prolongation of the Great Western line from Paddington towards the heart of London having been arrested by the magnitude of the expense which they involved, Mr. Brunel at last commenced the erection, on what had been acquired as a temporary terminus, of an iron station roof, which was the first attempt at the combination of architectural effect with engineering utility. The Great Western station still remains, in the opinion of many competent judges, the noblest structure of the kind that we possess. In comfort for the passengers, which ought to be one of the first objects of the engineer, as well as of the architect, it is unexcelled, if not altogether unequalled. In this respect it presents as striking a contrast to the discomfort provided for those who have the misfortune of wishing to take tickets at Charing-cross or at Cannon-street, as do the shapeless and enormous bulks of those two stations, seen from without, to the more architectural outline of the Paddington Station. It is a marvellous instance of how much the English public will tolerate, that is afforded by the ticket arrangements at Charing-cross and at Cannon-street. That the ticket issuer should be snugly ensconced in an inner chamber, provided only with the minute peep-hole that we have borrowed from the French railway stations, and which they, in their turn, borrowed from the French bankers, is perhaps not matter for complaint. But that outside this pigeon-hole, in the spot where intending passengers are forced to *faire la queue*, and wait their turn for attention, should be an open passage, swept by a fierce and murderous blast, is a disgrace to our civilisation. When the wind is northerly, we cannot hesitate to say that for a delicate person,—for any one liable to bronchitis, to pulmonary affection, to catarrh,—above all, for any young mother with an infant in her arms, to be compelled to take a ticket at either of these stations, is an almost certain cause of sickness, and a very possible cause of death. Out of the medical staff of the metropolis we have no doubt that, if the numbers could be summed up, an appreciable number of practitioners may be regarded as supported by this artificial and unnecessary cause of disease. Its protracted continuance is the more unpardonable, because a simple screen would protect the passenger, without annoying any one. We only wish that every director, engineer, and manager connected with all the lines using either of these terminal stations was obliged daily, and in his proper person, to take a ticket at the ticket-holes in question. In that case the evil would be remedied within a week. We invite the serious attention of all concerned to the importance of taking a simple and inexpensive sanitary precaution, which, there is little doubt, would save not a few lives in the course of a year.

In the immediate neighbourhood of these enormous and unsightly roofs we can see the various planes of movement now provided for the Londoner in full activity. Highest in level is the viaduct system of the South-Eastern and its allied railways, giving its hand to the South-Western lines at Waterloo, running on lofty arches, and crossing the Thames by noble bridges. The ordinary street traffic, approaching the level of the rails in the stations themselves, glides down the descent towards the river, passes under the arches of the railway viaduct, and skirts the Thames on the surface of the Embankment. Below this runs the line of the Metropolitan District Railway; while the broad surface of the Thames itself supplies a fourth parallel line of transit, varying as to its level according to the rise or fall of the tide. For gas, water, and sewerage yet a fifth line of level has in some instances to be taken. Sir John Rennie, when he threw a land arch over Thames-street, may be said first to have inaugurated this harmonious co-ordination of different planes of level for the traffic of the metropolis. It was a bold and happy idea, when first started; and it is one without the development of which London would at this moment be simply impassable.

With all this costly and admirable provision for the facilitation of the daily intercourse of London, the tendency to agglomerate, to mass, and to crowd together, becomes yearly more powerful. The more accessible the heart of business, or of fashion, or of any of the other elements of which London is the centre, is made, the more precious does every foot of ground become. The reclamation of the 37 acres saved from the river-bank and mud by the 6,640 ft. of Northern Embankment of the Thames, which

cost 395*l.* per yard run, amounted to 23,400*l.* per acre. But in July, 1872, the site of St. Mildred's Church, in the Poultry, was sold for the sum of 46,105*l.*, being upwards of 20*l.* per foot superficial. No wonder, then, that wherever we see new buildings going on in London, we find floor rising above floor. We have not yet arrived at the stage of rearing that multitude of towers which characterised the Mediæval cities of Italy, but we are certainly tending that way. One of the most striking instances of the mode in which the increasing value of area is driving the architect to develop the castellated, or at all events the towering, form of building, may be seen by a glance over the still open area of the Green Park. Spires and towers of churches no longer rise in solitary beauty towards heaven. Their most aspiring companion, from this point of view, is the great hotel at the Victoria Station, which shows a lofty castellated outline almost recalling to the memory that of the old palace of the Popes at Avignon.

This gradual rise, story after story, of public buildings, emulated as it is, in some instances, by the builders of private houses, is intimately connected with the question, which has attracted of late much attention (both in our own columns and elsewhere) of the construction of private houses of more massive and solid structure than our actual wont, and in which the division of ownership, or at least of occupancy, shall be in horizontal rather than in vertical planes. We have no hesitation is confessing that our feelings, and to some extent our judgment, have long militated against this suggested change. Neither are we of opinion that certain well-known efforts to introduce into London the system of flats have altogether tended to remove our objections. But it is imposible to close the eyes to a march of events such as we have attempted to sketch. For a long time the sturdy sense of independence which found expression in the well-known phrase "Every Englishman's house is his castle," has kept the great bulk of our London population in three or four story houses, while our neighbours in Paris, with a population of 1,851,800, against the 3,254,260 of London, have long ago ascended *au huitième*. As far, however, as either independence or actual defensibility of a private residence goes, there is no doubt that a lofty and solid structure, arranged in separate floors, is fully equal to a nest of small low houses. The points which seem to claim the most serious attention, as tending to determine, not our opinions, but the course of building operations in the future, are mainly three,—these are, the sanitary question, the question of quiet and freedom from disturbance, and the question of accessibility.

It will not be possible in the few lines for which we have space, to exhaust these three separate branches of inquiry. Still we may be permitted to glance at them. As to the sanitary question, no doubt anything that tends to bring more residents on to an acre of ground tends, other things being equal, to raise the death-rate. At the same time the facts which we have recently cited (p. 424, *ante*) amply prove that it is rather the crowding of many persons into rooms, or into cubical space, than their actual numbers per acre of ground, that is the real source of danger. No doubt it is desirable to have, for sanitary purposes, as few persons resident on an acre as may well be. No doubt the old rule of Queen Elizabeth's time, that every new cottage should be surrounded by four acres of ground was charming, from one point of view. But the millennium has not yet begun. Our best advice will not deter people from crowding. If the houses are low, small, and paltry, they will still, in certain situations, be densely packed. By giving better accommodation we may, it is true, make room for a few more residents per acre. But we shall at the same time give more cubical space to every resident; and thus the good that will be effected by a more palatial style of building (for which only the system of flats will allow us to pay) will far overbalance the attendant evil, serious though the latter must be admitted to be.

As to quiet, it is essentially a question for the architect. Those persons who, being themselves of a nervous temperament, happen to live between two neighbours of strong musical tastes, and whose ears are tortured at all hours of day and night by remorseless pianos, which, through the readily-conducting partition walls, sound always out of tune, out of time, out of reason, and become simply intolerable nuisances and torments, would gladly compound, in many instances, for the patter of children's feet overhead, even if that patter seems to them to be pounding. By adequate care, we think that noise may be, and probably will be better, arrested by horizontal partitions than by vertical; at all events, by that kind of horizontal partition which is proper for the style of building under discussion, than by that kind of vertical partition which actually prevails, as a rule, in London. As to quiet, therefore—provided always that competent architects be consulted—we think the balance will not turn against the separate floors.

As to accessibility, we must take advice from actual experience. There is no doubt that the use of the hydraulic lift is as yet in its infancy. There can be no doubt of its applicability as an immense saving of human labour. It is true that science informs us that in no way can a man perform so much labour as by walking upstairs. If his weight be used as a counterpoise, he can raise, we think, four times as much weight to a given height in this as in any other manner. But a certain concentration of duty is necessary in order to take advantage of any mechanical power. In a great house, and great household, one or more lifts may be advantageously employed. In a small household the economy of labour will not be so apparent; and yet it may be much needed. If, then, this economy be effected, not by repeated liftings of each individual of a family from floor to floor throughout sixteen or eighteen hours of the twenty-four, but by once or twice lifting each member of the household to the plane on which he passes the greater portion of the day, free from any up and down stairs work at all, it is evident that the saving of personal fatigue will be very great. At a time when it is becoming daily more and more difficult to secure that personal service on which we have become perhaps too dependent, this consideration has very great weight. In some of the large blocks of buildings in the United States, as many as three lifts are sometimes to be found. We cannot but think that for flats of a moderate size, a central lift, with rising and falling motions to counterbalance one another, communicating by speaking-tubes between the porter and every floor, and, if preferred, with a staircase running round the lift turret for use in case of need or of preference, would soon become, not only an admissible, but a favourite mode of ingress and egress to our dwellings. As far, then, as we have had space to enter into detail, we think that neither sanitary considerations, love of quiet, nor fatigue in ascending to considerable height, are likely to deter occupants from availing themselves of accommodation of the nature contemplated.

ON STYLE AND PROPORTION IN GOTHIC ARCHITECTURE*

I WISH to call your attention to the general want of pure style, and its concomitant quality, correct proportion, in Gothic architecture as at present practised, defects which seem to me to arise either from a mistake about true principles, or from a want of leisure to carry them out. No doubt there are some among you who feel inclined to exclaim, "Were not the true principles of Gothic architecture discovered years ago, and enunciated by Pugin and others? Have they not been acted upon ever since? Have we not developed the capabilities of the style, and made immense progress in it? Has it not, in fact, become the fashionable style of the day, and been adopted most successfully in our public buildings?" To this I would reply by endeavouring to show that for the most part there is a misconception about true principles, and that if there has been a movement at all in the art it has been retrograde instead of progressive. It is true that we possess innumerable buildings in various styles of so-called Gothic. We have, for instance, *International Gothic*, a jumble of English, French, and Italian details, for our places of worship. We have *Victorian* Gothic, the chief characteristics of which are granite columns, cabbage-leaf capitals, arches and mouldings of all imaginable forms, for our clubhouses, theatres, and music-halls; we have *Builders' Gothic*, with its thin clustered columns, dog-tooth and other ornaments, for our shop-fronts and warehouses; we have *Engineers' Gothic*, with its cast-iron columns and wrought-iron groining, for our railway stations and bridges, and so on *ad infinitum*,—that is to say, we have been driven by the fickle breeze of fashion into the turgid sea of eclecticism, because we have abandoned the sheet-anchor of true principles.

* By Mr. R. Popplewell Pullan. Read at a meeting of the Architectural Association on Friday, the 5th inst.

Let us briefly consider what the guiding principles of modern Gothic should be. It has been asserted with truth that the principle upon which the Mediæval architects worked was, *to employ the best construction which the materials at their disposal allowed, and to decorate the constructive forms in the most appropriate manner.* This, in the abstract, is the principle of all good architecture, at all periods of the history of the art; for what is architecture but the art, or rather the science, of building in the best manner with the best materials? Thus there is, or should be, a sort of architecture most suitable for iron, another for wood, another for concrete, another for brick and marble; but these are independent of what we term the styles,—that is to say, of Greek, Roman, Italian, and Gothic, which are imitations of the buildings of different nations and ages. As soon as we begin to employ these a new principle, the imitative, steps in. When they are used, architecture becomes an imitative or fine art. Now no one will contend that Gothic pure is the best suited for all the multifarious requirements of the present day. In the large public edifices of this gloomy city we require as much light and air as possible; and roofs of immense span which cannot be obtained if we use only the lancet windows, groined roofs, small openings, mullions and transoms of any pure Gothic style. If a Mediæval architect were living now, and had to design a railway station, acting on the principle I have just mentioned, he would put aside his former notions and adopt cast-iron construction and elliptical roofs in place of lancet windows and stone vaulting. Thus Gothic architecture is purely an imitative art, suitable only for churches, dwelling-houses, and smaller edifices. If employed in large public buildings it has to be tortured and twisted into all sorts of conceivable forms to adapt it to modern requirements, unless we are content to forego the utilitarian spirit of the day, and to sacrifice some of our comforts and luxuries for the sake of making our edifices fine works of art, and this sacrifice is often made and worth making. In all imitative art it is the object of the artist to render exactly the character of the subject he imitates; for instance, when a painter copies a flower, he studies the twirl of the stem and the droop of the leaves, in such a manner that he can at will reproduce a group of similar flowers, all possessing the characteristics of the original model. He does not attempt to improve upon nature by imparting the rigidity of the thistle to the leaf of the rose or lily of the valley, or by joining oak leaves to the flower of the crocus. So the architect, when about to design a church in the style of a certain period, should study the characteristics of the buildings of that period until he becomes thoroughly imbued with the spirit of that style, and able to reproduce without actual copyism. He should not, any more than the painter, endeavour to improve upon his models by engrafting the full-blown Perpendicular on to the budding Early English for the sake of a little variety. I have tried to prove that the principle of the Mediæval architects is not that of our Gothic; that theirs was scientific, ours should be artistic. If we persist in using Gothic forms of all dates and styles, and picturesque bits of our own invention in the same building, together with Italian proportions, let us be fair and call our architecture by the right name,—the Pseudo-False Gothic, or, what it might be more properly called, the Eclectic style. This may seem to some of you a rather narrow view to take of the noble art of architecture, to fetter it by confining it to some of the numerous styles or schools. But it is quite the reverse: it is simply bringing common sense to bear upon the subject, liberating us from the tyranny of schools. Common sense teaches us to build in the manner best suited for the object in view. For instance, pure Greek architecture is only fitted for a limited sort of building, where skylight and but few external openings are required, such as museums, picture galleries, porticoes, and such like, which can be designed without any sacrifice of the character of pure Greek architecture; Roman and its adaptation in Italian and Renaissance, as practised, for instance, in Venice, is adapted for palaces, clubs, warehouses, &c.; Gothic for churches, colleges, country and town houses, and so forth. So that, if guided by common sense, we should select that style which will be most appropriate to the end in view. But there have arisen of late years structures to which none of these are applicable,—Railway stations, Crystal Palaces, shop-fronts, aquaria, and rinks. Do not let us caricature any of the known styles by adapting them to these pur-

poses. What would you think of the taste of the man who designed a rink in the ecclesiastical style? Surely there is sufficient invention left us to enable us to put together our materials in an ornamental manner; to invent a style which shall not be a monstrous combination of all the known modes of ornamentation, of which the principles are utterly opposed to one another. Though sufficiently eclectic in taste to admire any building that has the true character of any known style, except the hybrid Elizabethan, or that negation of style known by the name of "another good queen," as a work of art evidencing skill and talent in the designer, I am bitterly opposed to that eclecticism which prevails in many of our large public buildings, and which is the architectural vice of the age, and take every opportunity of protesting against it, especially when it usurps the rank and title of Gothic; for Gothic is our sole national and sole ecclesiastical architecture, and is our only national style, because no other style worth the name has ever been developed in England; it is our only ecclesiastical style, since it is acknowledged on all sides, even by those who have no affection for the word "ecclesia," that it is the most appropriate for places of worship; it is, in fact, associated in our minds with the idea of worship, because it is the style of the noble cathedrals, abbeys, and parish churches which adorn our native land. Let us, therefore, endeavour to keep it from degradation.

It may be asked, To what purpose is all this protestation? Are not our churches and other Gothic buildings sufficiently pure to satisfy critics, and have we not to deal with a public uninformed in art matters, which does not require the extreme severity which you advocate? Is it true that critics are easily satisfied now-a-days, but outside the profession there is scarcely any one qualified to be a critic. It is, however, no less true that there are but few churches in London that are perfectly pure in style, and that would stand the test of a proper criticism, in which all the details are in keeping with the spirit of the style. This you can prove yourselves if you will take Rickman, the Glossary, or some other handbook with you on the occasion of the periodical visits of the Association to the public buildings of the metropolis. Criticise contemporary works and take notes: you will find the custom immensely useful in future practice. The result will be that you will find in many churches anachronisms such as these,—lancet windows, plate tracery, and flowing tracery side by side; four-centred arches and geometrical tracery in others; detached colonnettes and columns in Third Pointed buildings, and mouldings of all periods intermingled; and should you find the details correct you will frequently find the proportions deficient, for it must be remembered that each style had a characteristic proportion, and that it is as erroneous to build an Early English on the proportions of a Perpendicular church as it is to place a lancet and a Late Perpendicular window in juxtaposition. But more about proportions presently. It is true that you have to deal with a public utterly uninformed on the subject of Gothic architecture, or we should not see our cathedrals, colleges, and parish churches ruined by incorrect restorations. But the public will soon become more enlightened on such matters. Before long it is to be hoped the rudiments of architectural criticism will be taught in our schools and colleges, then woe be to the man who palms off an eclectic for a true Gothic building. Let us not descend to the low level of public taste, but endeavour to improve it. Let us put perfection before us, so that we may at least attain to some excellence. It is for you, the architects of the future, to remedy this state of things. The older members of the profession have, for the most part, got into grooves from which it is difficult to oust them. But you have great opportunities. Your happy idea of studying the churches of France, under the guidance of a distinguished archæologist, has enabled you to trace the progress of the Norman style from its birth in the crypt of Bayeux to its culmination in the spires of St. Étienne at Caen; to mark the influence of the East in the domes of Angoulême and its neighbouring churches. Elsewhere you have seen the full development of the best period of art, as at Amiens, Laon, and Rheims; and you may perhaps be able to study the influence of classical models at Toulouse, Arles, and Autun. Thus you have studied style in the best school, therefore it will be the less excusable if you join the eclectics and mix all the styles together. Early French Gothic is suited for our churches on account of the simple beauty of its mouldings; and it has been used with success by some of our best church architects. Employ that if you will, or even Italian Gothic (though that is inferior), but do not mix English, French, and Italian together, and call the composition good Gothic architecture. Now I ask all those amongst you who have been struck by the fitness and beauty of these grand French churches, and who are, in some degree, possessed with a love and admiration for Gothic art, to join me in protesting against eclecticism, and to combine to form a Purist school of Gothic architecture. I have heard a Purist school spoken of, but if it exists, where are its works? where its professors? where its writings? and where its scholars? In a pamphlet published a few years ago I remarked that if "Webb, Glynne, Willis, Whewell, Williams, Parker, Bloxam, and others were to have combined for the advancement of correct architecture, the Purist school (which they would have formed) would have triumphed, and our churches, instead of being mixtures of all things rich and rare, would have been harmonious compositions, recalling the best productions of the Middle Ages." But it is too late for this combination now. Some of these eminent men have passed off the stage of life. There was also a chance of forming such a school when the Ecclesiological Society existed, as it constantly held the whip over offending architects, and tried hard to keep them in the right path, but it died before its work was completed, and we have lapsed into the errors it exposed. But you, for the most part, have life before you; you have opportunities for educating your taste which others have not had; you have seen buildings and books which your predecessors have not seen. I know it is much more difficult to design in correct style than in the haphazard manner, as it requires some years of study and observation to be thoroughly imbued with Gothic feeling, and, moreover, a passion for that kind of art. If any one here has such a passion, let him nourish it, although it is opposed to the restless utilitarian spirit of the day. This reminds me of what I said at the beginning of the lecture,—that sometimes those who understood true principles had not leisure to carry them out.

We live too fast for the patient perfecting of fine art architecture. We, for the most part, manufacture our churches. Those about to build a place of worship generally go to the firm most in vogue. Acting in the true commercial spirit of the age, they naturally wish to get as much prayer and praise out of the smallest possible space, at the smallest possible cost; they inspect the stock patterns, select their style for their price, possibly bargain that a little more ornament may be thrown into the bargain, and in due course of time are presented with "a neat thing in churches" at a reasonable price per sitting, and the job is done. Or should they by any chance go to an architect who possesses a certain amount of talent and originality, and who ventures to exercise his judgment in the choir subjects for decoration,—statues, for instance,—they pounce down upon him, and declare they will have nothing more nor less than is in the bond. The Mediæval builders did not act in this commercial spirit; they erected churches which in some way corresponded with the wealth of their community or the size of their town. They did not stint the congregation as to space; they did not feel much concern if there was praying-room for a few hundred more than the inhabitants. They burnt with a noble ambition to erect temples worthy of their destination, trusting that if they could not finish them their successors would do so. It is no disgrace to their memory if they were often too sanguine in this respect, and if they commenced cathedrals which their successors could not finish. To us it is a matter of congratulation; for it is to this ambition that we are indebted for those colossal fragments of Mediæval architecture which tower above the mean buildings of modern times in many Continental cities; such are the choir of Beauvais, the solitary spire of Strasbourg, the giant tower of Mechlin,—grand monuments of the spirit of the age which produced them. I cannot advise, however, an exact imitation of this spirit. It would not answer if you were to overshoot the mark and leave your churches unfinished in order that others might have the satisfaction of completing them; you would inevitably be considered mad, and would lose your practice; but what I would advise is a careful study of the spirit of the style they practised, and an imitation of it down to the smallest details, and especially of the proportions which characterise the building of each successive period.

This brings me to the second part of the lecture—Geometrical Proportion. Many architects belonging to the so-called Gothic school scout the idea of proportion altogether. They say that it is useless to design a building on paper according to strict geometrical rules, as the foreshortening in perspective and the difference of planes will destroy the proportion in execution. But, on the contrary, we know that Greek and Roman buildings are equally satisfactory to the eye in drawing and in execution. We may depend upon it there is no good architecture without good proportion, for without proper proportion architecture is merely indifferent building. I am convinced that all the best buildings of the best Gothic period, such as Sainte Chapelle, Amiens, and the Cathedral of Lausanne, were designed on certain principles of proportion, and have ascertained that this was the case as to the latter building by measurement. This fact has attracted the attention of many eminent architects and writers on architecture. The first to call attention to it was Cesar Cesariano, the translator of Vitruvius, who proves clearly that Milan Cathedral was designed on the lines of a combination of squares and triangles.

This idea was developed by Kerrick in a paper in the 19th volume of "Archæologia," who applied the form of the *vesica piscis* to many ancient examples with great success,—to the plans of Bath Abbey Church; Croyland, Lincoln, Hereford, and other cathedrals and churches. Hawkins, in his book on Gothic Architecture—published in 1813—recapitulated the evidence in favour of the system of proportion. Professor Cockerell, in a paper read at the Winchester meeting of the Archæological Institute, showed that the *vesica* gave William of Wykeham the guiding lines for the plans of his chapels at Winchester; All Souls', New College, and Magdalen, Oxford; but he found that the equilateral triangle did not apply to the sections of all these chapels. In the 7th volume of the same Institute there is a valuable paper by Mr. Penrose on the proportions of Lincoln Cathedral, which he proves to have been originally designed on the system of squares called *parequadrato*. But Viollet-le-Duc in his Essay shows conclusively that triangles of various forms characterise generally the buildings of successive periods. In the round-arched styles, the rectangle was used; in Early Pointed, what he terms the Egyptian one, in which a perpendicular line drawn from the apex equals 2½ parts to 4 parts of the base; in later periods the equilateral triangle together with the Egyptian. He applies his system to many of the churches he had opportunities of measuring when engaged in the work of restoration. In the church of St. Sernin, at Toulouse, a noble Romanesque edifice, with double aisles, the interior of which strikes every one who enters it, on account of its fine proportions, he found that on dividing the ground-line into forty parts, five of them gave the half width of the nave, two the thickness of the pier, four the width of the inner aisle, two the thickness of the second pier, four the width of the outer aisle, two the thickness of the wall, and one the projection of the buttress. An Egyptian triangle springing from the outer base-line gives the springing of the vault of the nave, and the abacus of the arches of the aisle. An equilateral triangle, rising from the centre of the piers of the arch, meets this in the centre of the arch and gives the length of the nave arches. In the Sainte Chapelle he shows that two equilaterals give the slope of the arch over the windows; another based on the window-sill gives the springing of the groins; and that others govern the entire composition internally and externally. He applies the same principle to Amiens, Notre Dame de Paris, and Bourges Cathedral, which latter he asserts was designed upon the lines of rectangles, and that this proportion was here adduced from Romanesque traditions, which prevailed for a longer period in that part than elsewhere in France. Whether he be correct in all the details of his system, does not affect the fact which he has established, viz., that all the best buildings were designed upon certain principles of geometrical proportion. Even if this fact itself were doubtful, there is no reason why we should not design on geometrical lines; for not only should we produce results more pleasing to the eye, but we should find the whole process of designing made easy, if by drawing a series of equilateral or other triangles we obtained fixed points for the positions of doors,

windows, vaulting, and so on. In this manner even those who have no eye for proportion could produce excellent designs if they were masters of detail. In order to show you how this system may be applied, I must have recourse to a design in which it is thoroughly carried out. More than twenty years ago,—ten years before Viollet-le-Duc's Essay was published,—I had occasion to make a design for a cathedral in the French style of the first half of the thirteenth century, the period in which the Sainte Chapelle was designed (the building of it was commenced in 1250). My first object was to ascertain what were the leading proportions in buildings of that period. All the systems which I have described have reference to what may be called the *occult* proportions,—that is, to the angles upon which the construction was based. I call them occult proportions because, supposing a building were designed upon equilateral triangles, the bases of which did not come within the scope of the vision of the spectator, the beauty of form afforded by the triangle would not be perceptible. My wish was to ascertain the *visible* proportion, such as the height of the nave or the aisles in relation to their breadth. On comparing the sections of contemporary buildings, such as Sainte Chapelle, Westminster Abbey, and Amiens, &c., I noticed the prevalence of a certain triangle, which seemed to afford governing lines for the whole; it is shown on the sections which I have prepared. In that of the Sainte Chapelle, one triangle of this description embraces the two lower sides of the wall springing from the centre, and the apex of the main rib. In Amiens, two similar triangles give the height and width of the nave. In the section of Westminster Abbey, which I have had enlarged for the purpose, you see the application of similar triangles. In this case the base is on the ground, not above the lines of bases, as in Viollet-le-Duc's theory. Having thus discovered what I call the *generating* triangle, I applied it in the manner shown in the drawings. To refer to the plan. The width of the nave being given, two triangles, based on the centre line of the wall, give the extent of the transepts, and a third, the centre of the *chevet* of the Lady Chapel; another on the aisle wall gives the projection of the baptistery; two others the length of the nave between the baptistery and transepts; their points of intersection the centres of the columns. The column being made of suitable size, similar triangles give the position of the vaulting shafts. The projections of the buttresses and minor details are obtained in a similar manner. In the transverse and longitudinal section the same sort of triangulation governs the whole. The east elevation affords a complete illustration of my system. I applied the same system to every detail, and to all the furniture of the edifice.

What I have endeavoured to show is that, by the adoption of the system of triangulation throughout the whole building, a beauty and unity of proportion can be attained which can be produced in no other way. Whether the result is satisfactory to the eye in this particular instance I must leave you to decide. As it is difficult to illustrate such a subject by ordinary lecture drawings, I have had a series of transparencies made to exhibit the general proportions of each part of the building, and though this will not give the details very clearly, they will, I think, show well the outlines and forms of the processes. The system can be applied to small as well as to large buildings, and as I approved of it in the case of this cathedral, even to the simplest piece of furniture, I am convinced that, if you try it, you will find that you will make far more satisfactory progress than those who design in a hap-hazard undecided manner, by what Viollet-le-Duc terms a series of *tâtonnements*, however picturesque some parts of their designs may be. In conclusion, I can only express a hope that some amongst you at least have been converted to the belief that pure style and correct proportion are essential to perfect Gothic architecture.

Brighton Improvements.—The General Purposes Committee of the Corporation of Brighton have appointed a committee, consisting of the Mayor (chairman), Aldermen Cox, Ireland, and Reeves, and Councillor Payne, to consider the offer made for the Medina-road, on which to construct the Palace of the Cliff, the designs for which were made by Mr. Archibald D. Dawnay. The cost is estimated at 100,000*l*.

THE RESTORATIONS AT THE CHURCH OF ST. ANDREW UNDERSHAFT.

DURING the last twelve months very extensive alterations have been in progress at the Church of St. Andrew Undershaft, Leadenhall-street, one of the oldest of the City churches, and the works having at length been completed, the church has been re-opened. The works just completed have involved an entire re-arrangement and re-modelling of the interior of the edifice. Several structural alterations have been made, the most extensive and costly of which is the formation of a new and much-enlarged chancel and sanctuary. This has been effected by bringing the chancel area forward into what was formerly the body of the church to the extent of about 22 ft. beyond the old communion-rails, and it now occupies the space bounded by two of the nave arcades, being separated from the nave by a newly-erected stone screen. The floor of the chancel and sanctuary is 4 ft. above that of the nave, the chancel being approached by two steps, and the sanctuary by a further flight of three steps. The chancel floor is paved with encaustic tiles, relieved at intervening spaces by diamond-shaped white polished marble, whilst the floor of the sanctuary is laid with mosaics. The chancel is enclosed on each side by a stone screen between the arcades, uniform with that in front which divides it from the nave. It is fitted with clergy and choir stalls in carved oak. The organ has been erected on the south side of the chancel, having been removed from the gallery at the west end, which has altogether been cleared away. This gallery, together with the organ, blocked up the west window, and their removal has admitted of the mullions and general stonework of this window being restored, and the stained-glass window, formerly over the chancel at the east end, containing full-length representations of Edward VI., Queen Elizabeth, and other monarchs, has been placed there. In lieu of the old stained-glass window just named, a new one has been placed at the east end, presented by the Rev. Mr. Blomfield, the rector, the cost of which is stated to be nearly 1,000*l*. The upper portion of the window represents the Ascension, and the lower portion the Crucifixion; and on the wall under the window, on each side and immediately over the altar-table, a reredos has been formed by the introduction of paintings containing full-length figures of the Prophets, Evangelists, and other Scriptural characters. The stained-glass window and paintings have been furnished by Messrs. Heaton, Butler, & Bayne. The pulpit has been lowered, and removed to the south-east side of the church, where it now stands on a stone pedestal. The alterations in the body of the church include the removal of the old-fashioned high-backed pews, and the substitution for them of low open benches, made of the same old oak which formed the pews. They have all been stained and polished. The aisles of the church have been paved with red and black tiles, and the mural decorations consist of each side of the upper portions of the chancel being coloured, with Scriptural figures introduced, the walls of the main body of the edifice and the nave arcades being coloured in a light neutral tint.

The body of the church was restored under the superintendence of Mr. E. Christian, acting for the Charity Commissioners, and the new chancel was designed by Mr. A. Blomfield, architect, brother of the rector; and the contractor is Mr. Ennor, of Commercial-road East.

THE PHILADELPHIA EXHIBITION.

THE gallery over the south entrance is reserved for the exhibits of English stained glass. The light is very strong, and the manufactures in many instances show glass only suited to our own climate.

Heaton, Butler, & Bayne exhibit both ecclesiastical and domestic glass. "St. Timothy," "The Agony in the Garden," and "Christ Bearing the Cross," are light in treatment; for their position the figures and details are well drawn. The Four Seasons—Night and Morning,—the latter very coarse in details of figure. "O Lancelot, get thee home to thine own land," has little positive colour, and is a beautiful specimen of domestic work.

Cox & Sons fill one of the large windows. Among their exhibits, "The Sermon on the Mount," three lights, seems especially adapted for the situation both in colour and treatment. "The Crucifixion" and "The Adoration of the Magi," are too transparent for the aspect. A small panel, after Holman Hunt's "Light of the World," is a copy of the large window placed in St. Luke's Church, Philadelphia.

The domestic glass illustrates selections from the British poets, with one panel "Spring."

Messrs. Gibbs & Moore show two grisaille lights, with medallions, containing sacred monograms, and the signs of the Four Evangelists. The figures and drapery of the two lights, "Birth" and "Presentation of Christ," are well studied and rich in colour.

On the north side of the building is the "Last Supper," by the same firm, painted on a new material introduced by them, being easily fixed, and impervious to damp. There is also a frame of well-executed hand-painted tiles. Messrs. Hardman's exhibit is not yet in position.

Messrs. Barnard, Bishop, & Barnard, of the Norfolk Ironworks, Norwich, have erected an ornamental pavilion of cast and wrought iron, manufactured from the designs of Mr. Thomas Jeckyll, of London. The structure,—35 ft. by 18 ft., and 35 ft. high,—is of two stories, Japanese in style, intended for use as a garden pavilion or summer-house. The roof is covered with curved zinc tiles. Surrounding the buildings are railings of wrought iron, divided into panels, with centre sunflowers, 11 in. in diameter.

Light columns, elaborately treated, in two heights, support the structure. The brackets springing from these columns carrying the verandah have enriched spandrels, beautifully cast in low relief, with flower and bird subjects. No two subjects being alike. The upper brackets under the roof are similar, but bolder in their decoration. Panels of floral and geometrical patterns are placed in the soffits between the brackets.

The gutters and cresting are ornamented with studies from the rose, honeysuckle, hydrangea, &c. The transoms connecting the columns are of open key pattern, with medallions of birds, fishes, and geometrical design; the upper transoms have open fish-scale panels. Wrought-iron railings, arranged in straight lines, enclose the balcony. The ceilings were to have been constructed of cast-iron panels, in bas-relief, but these and the ornamental cast-iron staircase to the balcony story are not included in the present exhibit. Embroidered tapestry, designed by Mr. Jeckyll, has taken the place of the panelled ceiling. Art-metal work and ornamental stores of every description are here shown.

New Jersey State Building.—This is specially designed as a temporary erection, and is admirably adapted for the purpose. Built of timber framing, the lower story filled in with ornamental boarding with the upper story, and roofs covered with native tiles, it can be easily taken down and re-erected on another site. The chimney is built of specimens of fancy bricks manufactured in this state arranged in patterns. It is a pity that the new tiles will not have time to "tone" down before the close of the Exhibition, as at present the red is very glaring. The architect is Mr. Carl Pfeiffer, of New York.

Ohio State Building.—The lower story is of native stone supplied by the principal merchants of the State, with their names painted on each respective exhibit. The upper story and side pavilion are framed and filled in with wood. The chimney is of brick. Galvanised iron roofing. The chimney-top and coping of the principal gable are supported by various firms who make iron work their specialty. The architects are Messrs. Heard & Sons, of Cleveland, Ohio.

SCHOOL CHURCH, RIPON.

THE foundation stone of a new Sunday School, to be built entirely at the cost of Mr. J. S. Hurst, J.P., of Copt Hewick Hall, was laid at Copt Hewick by that gentleman on the 20th of April, at a special service used for the occasion.

The new building will consist of nave, apsidal chancel, and south porch. The walls will be of brick, relieved by strings of pressed red and blue Staffordshire bricks. Moulded and splayed bricks are used for the windows. The roof is open-timbered, dressed for varnishing, with collar-beams and spandrels, supported on moulded and cut corbels. The porch is open-timbered, stained and varnished, filled in with panelling.

Sliding doors, with Gothic-headed panelling divide nave and chancel, which will only be opened during divine service. The windows are glazed with cathedral and matted glass.

The contractors are Messrs. Trees & Son, of Ripon; and the architects are Messrs. Lewis & Brodrick, of Ripon and Thirsk.

THE SUPPLY OF DEAL.

AT an official request, M. Broillard has compiled a Report, which we shall do little more than paraphrase, on the pine, or deal, supplies at present available in France. It has been published for the information of the world, as was the same writer's most masterly exposition with reference to the oak,—a wood less appreciated by the French than by some other nations of Europe. In the true French manner, nevertheless, he begins by generalising. "France," he recites, as though he were his own chorus, "possesses the beech, the birch, and so forth; but, above all, the resinous pine, and it is this which, they say, is in danger of being exhausted." Well, those who have lost their way among the woods that seem to march, like invading armies, upon and up the dark slopes of the Pyrenees, may not share in that opinion; but we are dealing now with authentic testimony. The pine, it almost says, is to the Frenchman of the South almost what the palm is to the Arab. Its straight and lofty stem is a material upon which the most ingenious of craftsmen can work; and it is this substance that really supplies half the modern house-decoration, dyed or not, in France. At any rate, it is among the most prominent objects in every Industrial Exhibition, though naturalists have contrived, as they usually do, to introduce a confusion, and confound the fir-tree with the larch. The French pride themselves, and justly, upon the uses to which they put the simple Northern tree. The cedar, says the Report, comes to them from the Atlas ranges, from the Lebanon, and from the Himalayas. They receive similar tributes from Araucania and Central America; they get even wood without foliage and without shadow from those Central American forests, and China is their last resort. Yet, none of these can answer the demand of common want and commerce,—deal. It is the wood of the North, and the wood for daily use of the world. Therefore, this Report and M. Broillard's comments upon it are exceptionally valuable. And one main reason is that the material is resinous. In certain countries, says our official French informant, "England, for example," all domestic utensils are made in deal. In Holland, and throughout the Low Countries, in addition to ship-building and house-building, every domestic utensil, every dairy pail, every milkmaid's yoke, every kitchen bowl and platter, is contrived from this plastic wood. In the year 1871, 25,000 square yards of it were exported from Sweden alone to Australia. The dockyards in the interior valleys of France rely for their merchant hulls upon deal exclusively, as do the manufacturers of furniture, when their customers cannot afford to pay for oak, ebony, or other costly woods. Ships, bridges, piers, railway foundations, telegraph posts, canal-borders, and all else kindred to these undertakings, depend upon it, and the result is that the consumption has been increased fivefold within the last twenty-five years. The question is put by the Commission, Why is this demand so universal? We must not enter upon the domain of natural history, or M. Broillard might lead us a long way; but the other points are important. Why are prices, in this market,—as far, at least, as the French forester is concerned,—so formidably upon the increase? It needs not to insist upon the several species, the French, the Spanish, the Greek, and the South American; the Himalayan, the Siberian, and the Japanese. The one quality now in process of exhaustion is the pine, or deal-wood, of the North,—that which is, in fact, principally known to commerce and to manufacture. It is a tree which flourishes, as is well known, at various heights, though always in the neighbourhood of mountains, which modern cupidity is doing its worst to disforest, as it has done the lower oak-lands of Europe. Now, this is a produce of the earth which should, by all means, be gratefully treated. It trespasses upon not half the space occupied by the oak; it grows more rapidly, and is of more multifarious use; and its other qualities are excellent. It is, as a wood, of the simplest possible structure; it is durable and elastic; it is light, and its very bark possesses a distinctive value; it is cheap, though likely to become dear if the present rate of waste goes on; and it can be machined in large dimensions, suitable for every purpose of wooden architecture, by land or sea. Moreover, says the French statement, it is good for damp, and good also for dry, weather, though less adapted for vertical supports than for horizontal planking, or similar auxilary service, as it were. That is to say, great weights will crush it; and this is certainly true, as the deal-merchants of the Baltic and the Black Forest have, over and over again, admitted. The common deal, in truth, while, of course, inferior to the oak, has less sap than its congener of the Pyrenees, grows in rings, expands most in the summer-time,—a circumstance which gives it a feeble constitution, and sinks into power, often under the action of the saw. For these reasons, the wood, as a rule, is rejected by turners. Yet it is none the less useful, or less sought after, on that account. Some qualities, indeed, we are told,—such as those in the forests of Herival, of Bosson, of Arc, and of Moplin,—are in great request for ships' masts, and many an American clipper arriving in European waters with damaged Canadian spars replaces them from the slopes of the Jura. And it is remarkable how the Americans, with their exhaustless native growths, manage to carry back with them the fine sawing-machines, the milking-pails, the billiard-tables, and the cleanly art-furniture specimens of Europe. But the sawing of this resinous European wood usually assumes the shape of planks, varying from a thickness of 4 in. to 2 in., though these measurements differ in the French from those in the English timber markets, and are altogether capricious when applied to wainscotings or floorings. The "saw-country" is in the close neighbourhood of the forest. Every rapid stream has its hundreds of mills; the entire vicinity is full of the rasping sound and the resinous scent; whole families are at work twelve or fifteen hours in the day; each, perhaps, delivers about 30,000 rough-hewn planks annually. In a year, sometimes, a whole forest disappears. And it is this fact which accounts for the seriousness of M. Broillard's remonstrance. There are, he says, mountains of sawdust, perpetually rising, of which modern machinery makes use. But is the supply inexhaustible? Steam has come to the assistance of the rivers, and the destructive process will become more rapid and remorseless, year after year. These masses of half-shaped timber, in rough or in smooth, are hurled down upon the current of the nearest river, like the rafts of the Black Forest, some stripped, and some in bark, and the substance of many a goodly tree is actually sold, upon the spot of its growth, for tenpence. The "white sap" is dearer than the "red sap"; but both appear doomed to extermination. We have a hint of this in a recent Swedish proclamation, which announces that pine boards, for the dockyard service, need not be of such large dimensions as formerly. "Thus," says the Report, "the Northern plank is now smaller than the French." But the ravage continues, although it must be said that a more provident spirit has been exhibited of late. Thus, when a big tree, for masting a ship or other similar use, is about to be felled, it is scrupulously topped, both in order to prevent danger to itself and to spare the younger growths around. Then the giant, cleared of all encumbrance, is hoisted upon a four-wheeled trolly, drawn by six bullocks, and driven by two wagoners; and, after a long journey, is converted into spars, wheelwrights' material, cask-staves, or furniture, as the case may be. It commands, in the market, as a rule, almost exactly half the price which is commanded by oak. But its cost is increasing. The nobler heights and dimensions have long threatened to disappear, and the medium sizes scarcely approach to a third of their value. And, as the more accessible districts are cleared, and the woodcutters have to work up among the mountains, the dearer and dearer becomes the market in deal. It is now, in many places, worth a guinea the square yard, whereas, sixty years ago, it would not command a tenth of that amount. We are speaking, no doubt, of first qualities, and upon the authority of M. Broillard's statement. Between 1830 and 1870 the price of this wood, in France, at any rate, for all purposes, was doubled. The tree takes forty years, at least, to attain maturity, and it is ruthlessly cut down, by "hungry generations," at half that age. What wonder, then, if an alarm be raised concerning our deal supply—because the protest applies to the north and south, not less than to the centre, of Europe? How much of it is hewed into billets, and sold for fuel? How much reduced to charcoal? It is killed for the sake of its turpentine, and its very bark, invaluable to the tanner, is wantonly wasted, in thousands of tons together. Yet the Thuringian woodsmen, who understand these things, call this "The Bread Tree," on account of its importance above all others of which they know. The French—let us hope before it is too late,—have recognised these truths, and are endeavouring to atone for past ruin and neglect. They are positively beginning to cultivate the pine, or deal tree, to graft it with the beech, and, with a peculiarity of phrase belonging essentially to themselves, to "educate" the forest. The pine-wood, they assure us, after having treated it most barbarously for half a century past, is a peculiarly delicate creation; it is a garden, and every tree is a flower. May it be hoped that no such rubbish will come out of Norway, although the official statement contains some ominous assertions relative to the deal-markets in that region. In fact, this perpetual hacking and hewing must bring on a crisis, at one time or another. Anywhere, a pine forest is the growth of, at least, 150 years, and many hills of the Pyrenees, now barren, desolate, and rainless, cannot be expected to recover their verdure in less than two or three centuries. France is feeling the effects of her prodigality in a way which few of her economists, belonging to a past age, anticipated. In 1873, her importations of deal from Sweden, Norway, Switzerland, and Germany, were enormous, and millions of money were paid to foreigners which might have gone to the account of her own "woods and forests" had they been honestly preserved. Purchases were made,—though on an insignificant scale,—in Italy, Turkey, and Austria; while Belgium did not allow a square inch of her native timber to pass the French frontier. Of course, France had at the same time an export trade, but nothing to speak of, in deal. But the main point is the probable diminution of the supply. "*En Suède*," says the French writer, "*on coupe tout ce qu'il est possible de couper*,"—"they cut all that can possibly be cut,"—but a new law has just come into operation which forbids the hewing of trees under a given age and size. Even those woodlands of the North, travellers assure us, are beginning to look like so many raw plantations. The flower of the country is withering, and our importations must gradually come from longer distances, at a greater cost. It is true that the mighty forest of Russia, stretching from Lake Onega to the Ural, is, as yet, in a comparatively virgin condition; but what can satisfy the ever-enhanced wants of modern industry? Russia is an empire of wood, wooden in a thousand different senses, and, at the present rate, even its vast resources of forest and timber may fail before the engulphing avidity of the times. Meanwhile, the French Report, if slightly exaggerated, points to some facts deserving, perhaps, of consideration.

LEAD IN ITS RELATIONS TO WATER SUPPLY.

TREATING, some time ago, of lead in its relations to architecture, we promised to recur to the subject in connexion with water supply, which is undoubtedly one of its most important aspects. In this article, accordingly, we have put together a few brief and imperfect notes on the chemical reactions of lead; and some other particulars.

The conclusion at which we had arrived was that lead is in every respect a superior roofing material to either zinc or galvanised iron. We may add copper which is still used under certain circumstances, and for these reasons:—The physical qualities of lead render the *working* of it easier than of any other metal; its chemical properties supply greater resistance to the action of the atmosphere; and, lastly, being among the metals the greatest non-conductor of electricity, it affords the highest security and protection to a building during the occurrence of a lightning storm. In some cities of South America,—chiefly, we believe, in Chili and Peru,—where sheet copper has been extensively used as a covering for platforms as well as ordinary flushings and aprons, the copper-clad roofs have repeatedly been found highly dangerous under such circumstances. The most of them sustained severe damage; while, in fact, the slate or lead roofs escaped uninjured. Since lead is also very low in the scale or series of heat-conducting metals, it follows that there is less expansion and contraction with changes of temperature. It likewise interposes to that extent a greater barrier to the action of the sun's rays on the interior of a building. Even slates, as we all know (small "Welsh Ladies," for example), in our own climate, to go no further

sometimes render the upper stories so hot as to be almost uninhabitable; whereas a lead roof,—partly, of course, owing to its greater solidity of construction,—exercises a much greater modifying influence. We will not press this point, however, as we have already noticed that the great expense of lead has gradually forced us to adopt a combination of slates and lead, which, if not the noblest form of our modern roof, is still, under certain limits, the most substantial, and may be made the most picturesque. Those who have studied the drawings of the Mediæval Dutch and German cathedrals and churches which have appeared in our pages need not be indoctrinated on the latter point at least; for, although it is a pity, it is true that our highest lessons in this style of art must still be derived from Continental sources.

A good deal might still be said with regard to the artistic treatment, but we need not enlarge further upon the application of lead to roof-work. The beautiful engrailed work of some old roofs: the fish-scale work, the curious projecting gutters, the rain-water pipes, the rain-water heads, spouts, gurgoyles, and finials,—all these, we are afraid, must now be consigned to the portfolio of the archæologist; since lead as a material is gradually being superseded by cast and malleable iron. For the covering of domes, cupolas, and other curved surfaces, lead is undoubtedly the proper metal; although even in these cases zinc has of late years also been applied with successful results. We may again insist here on what we previously pointed out, that lead imperatively demands the very highest skill and craftsmanship on the part of the plumber; and that it is the poorest of all economy to punish the lead-work of a roof in order perhaps to elaborate a plastered front, or add to the weight of a projecting cornice!

So much, then, with regard to lead as applied to the outside of a building. When we come to speak of its uses *inside* we must alter our eulogistic tone considerably. There can be no doubt but those physical and chemical properties we have mentioned which recommend the metal so pre-eminently for roofing and other exterior purposes also bring it to the front in the case of interior fittings,—that is to say, whenever it is intended to confine or convey water, or gas, or soil, or steam. Lead, in point of fact, occupies a foremost place in the economy of what we may briefly describe as domestic engineering. The reciprocal action of lead on copper, iron, tin, and zinc, involves questions with which the construction of every modern mansion, or building of any note, is more or less concerned. There are, for example, the *modus operandi* of hot-air pipes, hot-water pipes, steam pipes, and so forth, in which the merely mechanical principles of junction and the relative pressure on the tubes exercise the greatest influence on the safety and stability of the building.

It is almost impossible, indeed, to fit up an ordinary system of hot-water pipes, or even a kitchen boiler with a hot-water cistern at the top of the house in which lead pipes are not in some form or other made use of, and in which these principles do not come into play. It is hardly necessary to add that the utmost carefulness is requisite in the construction, and the most constant watchfulness in the practical operation of all such apparatus. The junction of lead with iron pipes in a hot-water system is often attended with danger; on this account alone that the expansion and contraction of the two metals, as well as their chemical affinities, are unequal. We have seen, for instance, a 1-in. lead pipe united at right angles by a soldered joint to a malleable iron pipe, which joint burst so repeatedly and so dangerously that the iron pipe had to be cut at the junction and a triangular brass socket soldered to lead and screwed to iron. We have also observed in several large breweries, where pipes of unusual calibre are employed that the joints of the huge brass stop-cocks with which they were furnished invariably gave way at the point where the different ratios of expansion might be supposed to converge, or even perhaps where a certain slow but sure electrical action had supervened. Another question of great importance in this connexion, is the action of frost on lead pipes, which, however, we have so frequently treated, that the whole causes and consequences of this phenomenon must be familiar to our readers. We will only repeat here, in the same tone of warning that we have so often had occasion to use, that a frozen water-pipe may signify either a burst boiler in the kitchen or a deluge over the drawing-room ceiling, or both and may often lead, and has repeatedly led, to serious and even fatal accidents.*

We may as well indicate here that however useful and convenient lead may be found with regard to interior fittings there are certain purposes, we may mention, to which it may be grosely misapplied. For example, there is one domestic use to which lead should never be put to under any circumstances,—that is, the lining of a kitchen sink. Those who remember the old-fashioned form of leaden sinks will recall the amount of trouble and annoyance which they gave to all good housekeepers. Constantly cracking at the bottom, or the junction of the soil-pipe, they were never thoroughly water-tight, and were thus the everlasting cause of damage from leakage. This was more particularly the case with respect to tenemented houses where the kitchen sinks overtopped each other in several stories, and where a leaky sink at the top of the house was the prolific cause of injury to the floors beneath. The introduction of iron for this purpose, and better still of stout glazed earthenware was a great boon to our kitchen-maids, and an important improvement in our household sanitary economy. Equally obnoxious, far more so indeed, is the application of lead to urinals, and, as we have even seen, to water-closet pans, of which disgusting nuisances there are still too many in existence,—particularly, as we remember, in the regions of Newcastle-upon-Tyne, and other northern towns. And the same objection applies *à fortiori* to soil-pipes of water-closets, which if not properly laid with a due inclination to the drain, and, above all things, properly ventilated, will sooner or later corrode at the joints, burst, and allow the poisonous sewer gases to escape into the atmosphere of the house, especially and most probably into the bedrooms during the night. We have, however, already touched more than once upon this startling subject, and pointed out the necessary precautions and remedies. But we may further insist here on the impropriety of that bad architectural practice,—still too frequent, we are afraid,—which plans a water-closet soil-pipe to be carried through lobbies and stair-landings, or even rooms; the plain consequence being, that these soil-pipes, lying at a dead level and often improperly flushed, just constitute a permanent and seething receptacle to soil in a state of putrefaction. We may also point out an error of a similar character which is often committed, and that is the burying of a leaden pipe in a wall covered with damp plaster, or in a ground track impregnated with lime, or perhaps filled in with lime rubbish. No substance exercises a greater corroding influence on lead than lime, as some of our readers know to their cost, and this is one case where corrosion is followed by evil consequences. The strongest of all objections, however, we can have to lead is its application to the lining of cisterns and to supply-pipes, properly so called. This at once opens up one of the most serious and important questions of the sanitary economy of the present day. And although the subject may be well known, and even hackneyed, to some of our professional readers, and besides somewhat too "toxicological" for our pages, our general readers will excuse another slight discursion on account of the importance of the subject, which can never, we fear, become stale. We refer, of course, to the poisonous action of lead upon water.

The subject was first scientifically investigated in this country during the earlier half of the present century by Dr. Sir R. Christison, professor of Materia Medica in the University of Edinburgh, whose researches have been generally confirmed by Dr. Alfred Taylor, of Guy's Hospital, Dr. Dalton, of Dublin, and many other medico-legal authorities whose works we have consulted. The French toxicologists, the celebrated Orfilla and Tanquerel, generally coincide in the conclusions at which these authors have arrived; and the German analysts and physiological chemists, Müller, Liebig, Virchow, and others of that school, likewise record their adherence.

But it is very remarkable that this form of mineral poison was not unknown to the architects and physicians of antiquity. For the action of water upon lead has been the subject of observation for many ages. Vitruvius absolutely forbids the use of this metal for conducting water, because "cerusse" (*i.e.*, white lead) was formed on it; which he very properly held was hurtful to the human body.* Galen also condemns the use of leaden pipes because he was quite aware that water transmitted through such channels contracted a certain sort of *muddiness* from the lead; the consequences of which were, that those who drank such water were subject to dysentery. Indeed, if we trace, as Dr. Christison tells us, the sciences of architecture, chemistry, and medicine downwards from these periods, nothing more will be found than a repetition of the sentiments of Vitruvius and Galen but a few particular facts in support of them till we arrive at the close of the last century.†

Within our brief limits it would, of course, be impossible to convey even a meagre outline of the laborious experiments and masterly inductions of these celebrated chemists; but the following *resumé* may help, perhaps, to make the subject more intelligible.

In order to ascertain the true chemical action of lead upon water, we must first of all look to the action of lead upon air. Whenever a fresh-cut surface of lead is exposed to the air it gets tarnished, a circumstance which is due to the strong affinity of the metal for oxygen. There arises a thin coating of the hydrated oxide of lead, which is easily transformed to the *carbonate*, which again seems to form the permanent crust. The opinion which many persons entertain that the dark crust of lead is a mere deposit of its oxide, is therefore incorrect. If lead were to oxidise continuously by contact with air,—like a particle of sodium in a basin of water,—we should have very little indeed to say of its history, and still less, we are afraid, of its architectural relations. The formation of the carbonate of lead is always accelerated by moisture, and probably by the presence of an unusual proportion of carbonic acid in the atmosphere; but, not to enter into minutiæ, in whatsoever way it may be formed this carbonate of lead, in all its forms and combinations, is a deadly poison.

When water passes through leaden pipes, or is stored in a leaden cistern, a similar chemical reaction occurs. Water, which is composed of oxygen and hydrogen, and almost invariably charged with carbonic acid, plays the same part, *mutatis mutandis*, in the process that air does, with this additional and aggravating circumstance that water *dissolves* the carbonate (which of course the air, or at least the dry air, cannot do), and according to the nature, extent, and duration of the necessary conditions holds this poison in solution.

These conditions, however, are so modified by a wise provision of nature that in the vast bulk of our natural supplies of water the antidote to the poison accompanies it and neutralises it. Whenever water contains lime, soda, potash, or other mineral salt, it deposits a crust of that salt on the surface of the lead in the form of *an insoluble carbonate;* and so protects its surface from the chemical action which invariably occurs when the water is pure. The conclusion at which we arrive here accordingly is a fact which should always hold a prominent place in our sanitary aphorisms:—*The purer the water the greater the danger of lead poison.* We will not enter upon the wide topic of the physiological influences of the poison. We need only mention that the symptoms which follow are first of all "lead colic," which is by far the most frequent form of disease; secondly, "lead rheumatism"; thirdly, "lead palsy or paralysis"; and finally, "disease of the brain," which is the least common, but the saddest of all the forms of lead poisoning. It is also proper to point out that the poison may be introduced into the system by being *absorbed* through the skin, and *inhaled* through the lungs, as well as being *imbibed* by the stomach; and with two or three short illustrations of these separate classes we will conclude our exposition.

1. In the first place, with regard to the poison entering the system through the stomach a whole catalogue of cases may be found in the authorities we have cited. It is perhaps sufficient to recall to the recollection of our readers the celebrated case of the Ex-Royal Family of France during their residence at Claremont, of which full details (of that and numerous others) will be found in Dr. Taylor's work;‡ and was copiously commented upon in our own columns at the time.

The water at Claremont was of exceptional purity; it acted on the leaden pipes, and the result was that no less than *thirteen* persons were

* See, among other references to this subject, an article in our volume for 1874, in which certain simple precautions are pointed out.

* Vitruv. de Architectura, l. viii., c. 7.
† See the Treatise on Prisons, ed. 1845, p. 526, *et seq.*
‡ The Principles of Med. Jurisprudence, vol. i., p. 298.

attacked with severe colic (including several members of the Royal Family), and, as far as we remember, two of the grooms died. Dr. Christison mentions a similar case which occurred at a gentleman's residence in Dumfriesshire, whose family were constantly ill, and to whom his professional services were called in. He immediately discovered symptoms of lead poisoning, which led him to examine the water; and he actually discovered that the lead supply-pipe, nearly a mile in length, which conducted the water from a very pure spring (proceeding out of rock, by the way) to the house was almost corroded to nothing throughout its entire length! We will explain presently what Dr. Christison did to avert the evil; but we may mention a case here, on the same authority, which is no doubt still common enough; and that is where a series of water-barrels, at a country house, fitted up to collect and store the rain water from the roof, which had been newly covered with a lead platform, gutters, and ridges, became so impregnated with lead that the whole family suffered from severe colic in consequence. We may add also that the danger is not confined to leaden pipes and cisterns, with their corresponding apparatus of water supply. It exists to a large extent in our ordinary cooking utensils! That vile practice, as Dr. Taylor justly calls it, which has sprang up of late years of substituting for pure block tin an alloy of tin and lead in the lining of our cast-iron pots is an extremely dangerous one, as we have before pointed out, and calls loudly for the sternest repression. And not only metallic pots, but earthenware vessels are also liable to the same fatal objection, simply arising from their *glaze*, which is always composed of lead in some form. Vinegar, or pickles, or any acid solution will produce the acetate of lead when preserved in such a vessel. Everybody knows, or ought to know, that boiling fat will melt and even dissolve lead; and cases are on record, such as a whole family being nearly poisoned, from eating the fat or dripping of meat which had been baked in a newly-glazed earthenware dish. The whole of this subject, which we cannot at this moment pursue further, has been recently investigated with great ability by a modern French chemist, Monsieur Gobez*; and our readers who wish to arrive at the newest and most authentic conclusions with respect to the poisons of lead introduced into the system through the stomach should consult that author's valuable papers, which are published in the *Annales de Hygiène* for the year 1869.

2. Our second division relates to the process of absorbing the poison through the skin. The commonest form of the disease in this case is "painter's colic," which is certainly also one of the worst forms of the chronic poisoning of lead. Dr. Taylor gives numerous instances of the baleful effects of lead on the systems of lead-smelters, white-lead workers, painters, and even plumbers. We have often recorded and described such cases, and need not repeat them. The symptoms are unfortunately too well known, and are described with great minuteness in most of the dictionaries and encyclopedias, under the head of "Lead Palsy" or "Paralysis." We may add here that lead is more injurious to the system than other metallic compounds, on account of its being a *cumulative* as well as an irritant poison.

3. But lead colic and paralysis may also be produced by inhalation; hence our next division relates to the absorption of lead through the lungs. Not painters and lead workers alone suffer from this insidious cause; but every symptom of the disease has been known to occur in the case of persons who have, for example, slept in newly-painted rooms. "I have, myself," says Dr. Taylor, "suffered from a severe attack of colic as a result of sitting in a room, for a few hours a day, in which a large surface of canvas for an oil painting had been covered with white lead and drying oil." Another case mentioned by the same authority is that of a military officer, who was fond of painting in oil colours, and who worked for some time in a studio 8 ft. square, which had a large stove in it. The consequences were that he was attacked with "wrist-drop," and soon afterwards with paralysis in both legs. His servant, who ground his colours and washed his brushes, had also a severe attack. "In these instances," continues Dr. Taylor, "the emanations of lead must have reached the blood through the lungs; although chemists may doubtless be found who will prove by ingeniously devised experiments that there could be no lead in the air of the room; and who—coupling their results with the fact that few artists are known to suffer from such symptoms—will therefore contend that lead was not the cause. The symptoms, however, were of that character which is peculiar to lead poisoning; and as the insidious effects completely disappeared on the removal of the patient to another atmosphere, I think there could have been no doubt whatever about the cause." †

It follows from all this that the atmosphere of a room tainted or impregnated with lead is as dangerous as the well known poisonous atmosphere induced by the celebrated green flock and gold papers which we have so often denounced, the colouring basis of which was found in numerous cases to be arsenic.‡

Having said so much about the poison of lead, it now remains that we should add something concerning the remedies; but here we must necessarily be very brief. It is not our business, of course, to grapple with the therapeutics of the subject; for the treatment of the diseases we have mentioned belong to the province of the physician. Our vocation—not less important, as we hold,—with regard to this and similar subjects lies more in the direction of *prevention* than of cure. Nevertheless, since we are treading as it were on the very threshold of the subject, we may venture to interpose a few words on behalf of suffering humanity.

First of all, let us say a single word with regard to its *detection*. To discover the fumes of carbonate of lead in the atmosphere of a room is rather a difficult and delicate operation (although perfectly certain and reliable), but the detection of its solution in water is one of the simplest processes in the whole range of analytical chemistry. We cannot go into details: it may be enough to say that with the simple apparatus of a watch-glass and a test-tube, together with a few drops of hydrochloric acid and of sulphuretted hydrogen in solution, it is quite sufficient to detect even the thousandth part of a grain in a gallon of water.

The symptoms in the human system are also easy of diagnosis or *distinguishment;* and it is only necessary that we should state here that the treatment of the disease in its various stages is entitled to rank amongst the greatest triumphs of our medical practice in the present century. Sulphur, sulphuric acid, sulphate of soda, sulphate of magnesia, sulphuretted baths, sulphur in some form or other, it is curious to know, is the grand antidote to the poison of lead. Its action, of course, like that of any other antidote, is to neutralise the active influences of the poison in the blood.

But the real fact of the matter is that preventive measures are, after all, the most beneficial; and exercise the most potent and potential influences for good. For example, in the case of white-lead manufacturers, where the poison enters the system chiefly through the skin, it has been found that *personal cleanliness* exercises a surprising effect on the health of the operatives. Painters, plumbers, lead-smelters, and other artisans who neglect to wash their hands before meals, little know the damage they are doing to their constitutions. Indeed, to give a specific instance, there was a large and celebrated *plomb-blanc* manufactory in the South of France, which was at one time notorious for its lead palsy. The proprietors, acting under the highest medical advice from Paris, at length adopted and rigorously enforced a system of sanitary precautions, which eventually put a stop to the disease, and very nearly extirpated it altogether! These measures were simple enough, and ought to be widely known. In the first place, the workmen were compelled at every meal-hour to wash their hands in hot water and potash, and also to *use the nail-brush*. Secondly, they had hot or tepid baths every evening before leaving the works. In the third place, a frequent change of clean *linen* garments was supplied to them; and finally, some supervision was exercised over the lead-workers' food, and the condition of their homes.‡

The laws of prevention,—which are more in our way, as we have hinted,—also operate quite as vigorously in the case of the lead poisons being inhaled through the lungs. In the particular instance quoted above of the officer's studio, ventilation immediately suggests itself as the most thorough-going and effectual remedy. We will not speak of the size of the room,—(8 ft. square!), which must be nearly incredible to persons who do not reside in London, and is certainly discreditable to the officer's common sense, and for this simple reason, that any size of room under the same conditions may have had its atmosphere poisoned, burnt up, and destroyed in a similar fashion. Given a hot stove, closed windows, a street-door, a blocked-up chimney-place, plenty of white lead and oil of turpentine, two or three argand gas-burners, and two or three pairs of human lungs, and it needs no ghost come from the grave to tell us the result of the problem. The Black-hole in Calcutta was hardly so bad. On the other hand, give us an open fireplace and two or three of Arnot's valves, or Banner's ventilators, or a system of hot-water pipes, or hot air entering from the surbase, and passing through the cornice of the ceiling, or a movable skylight hung on pulleys, or, in short, any method whatsoever (and the simpler the better) of providing an ever-changing supply of fresh air, and we will "stake our critical sagacity," as Lord Jeffrey used to say, that there will be no lead palsy or paralysis superinduced in such an apartment. As to artists, as a class, not suffering from the effects of lead paint, we are not so sure of that as Dr. Taylor seems to be. The symptoms of lead colic we are assured are frequent enough; and even palsy is not uncommon. Indeed, we have no hesitation in saying (and we speak from long experience, and extensive observation) that many a hard-working artist in oil colours,—particularly those who work much by gas-light,—has his valuable life abridged, and his days shortened, by the vile atmosphere of his studio. We ought to mention here that water-colours are, of course, quite innocuous in their handling; and although the idea is rather of a comical character, we have heard it repeatedly asserted that smoking tobacco, which most artists do in inordinate quantity, is also preventive or remedial of a poisoned atmosphere! We would not, however, stake our sagacity on this knotty point, unless we were in a position to prove (which, as at present advised, we are not) that a *narcotic* poison is counteractive of an *irritant* one.

When we revert to the poison introduced into the system through the stomach, we shall find the same beneficent principles still hold good. We have mentioned, in the case of leaden supply-pipes and water-cisterns, that Nature herself, in the vast bulk of potable waters, provides the remedy in the form of depositing over the surface of the lead an insoluble salt, most commonly a carbonate of lime. In the case at Dumfriesshire, where, as we have mentioned, Dr. Christison was called in, that eminent physician skilfully availed himself of this natural law to counteract the action of the water on the leaden supply-pipe, which conducting a very pure spring, was nearly eaten away. He had a new supply-pipe laid down, filled with water, and corked up at both ends for several months until the insoluble coating was deposited so thick that no danger could be apprehended. But this case occurred thirty years ago, and since then we have had the invention of coating leaden pipes over their inside surface with block tin,—a metal which, it is well known, has no poisonous re-actions; though objections of another kind have been taken to the arrangement. Such tinned lead pipes have, we believe, been laid down at Claremont and many other mansions throughout the country where the necessity for their application was found to exist, and always, we are informed, with the most successful results.

There are various reasons also in operation at this moment which render the use of leaden supply-pipes more dangerous than it was before. The most important of these, perhaps, is the additional quantity of lake water we are bringing into use (as in Glasgow), and of rain water which we are compelled to store (as in Edinburgh). Both of these waters are pre-eminently pure; and the evil consequences we have sufficiently indicated. Thirty years ago the Edinburgh and Glasgow waters contained sufficient mineral salts to render their passage through lead pipes quite innocuous. But we question very gravely whether this can be said at the present moment. Commending the subject to the consideration of the able public analysts of both cities, we will only further remark that sooner or later lead in all its forms must be removed altogether from the regions of our

* Cited by Dr. Taylor in confirmation of his own views, vol. i., p. 298.

* Principles of Med. Jurisprudence, vol. i., p. 302.

† The reader will find some account of this arsenical poison in our previous volumes.

‡ This highly suggestive and philanthropical case is mentioned by most of the medico-legal writers. For a full account of it see the *Revue des Mondes*, vol. xxii., p. 316. See also Dr. Reese's "Manual of Toxicology," 8vo., 1875, p. 261.

water supply. It contains most unquestionably a constant and most serious element of danger. Iron, tin, zinc, earthenware, concrete (why not?), vulcanite, or even, as Vitruvius suggested, *leather!*—each and all of these are better than lead. None, of course, are so easy to work as lead; but our plumbers must learn to march with the times, and rise to the occasion, or otherwise we are afraid another race of mechanics will gradually supersede them in relation to the public health.

PUBLIC WORKS AT BRUSSELS.

PRELIMINARY measures towards the realisation of improvements, long debated by the municipal administration of Brussels, have at last been adopted. A scheme known as the Project Bordieu, from the name of its originator, was discussed in 1874, and finally approved in January, 1875, by the local authorities. The Royal assent, however, was only obtained in the ensuing December, and the works are to begin by the excavation of some 150,000 cubic mètres, preparatory to the reconstruction and transformation of the north-eastern portion of the Quartier Léopold. According to the scheme, the Plaine des Manœuvres will be sold for building purposes, and another drilling-ground, more conveniently situated, will be opened on the 1st of January, 1877. The plan was evidently well conceived, for it did not give rise to any opposition, and was almost unanimously approved by the landlords whose property will be affected, though there will be expropriation over an area of about 200 acres. The compensation to be paid has also been satisfactorily arranged by two experts representing the rival interests,—the one being appointed by the municipal administration, and the other elected by the proprietors interested in the matter. These latter were convoked to a general meeting at the Hôtel de Ville for the purpose of selecting a suitable representative. The first new street to be built will run from the rondpoind de la Rue de la Loi to the Chaussée de Louvain. This and the other new streets will be made by contract, subject to such modification as the municipal council may suggest as the works progress.

CORTILE OF THE PALAZZO VECCHIO, FLORENCE.

EACH of the columns in the great court of the Palazzo Vecchio has a different ornamentation, and the result of the whole, as shown by the accompanying engraving, is sufficiently interesting. These are attributable to Michelozzo (who lived from about 1402 to about 1470), and are examples of the Italian Renaissance. In the middle of the court is a fountain designed by Vasari, and which includes a fine statuettte in bronze. The highly ornamented aspect of this Cortile, with its garlands and festoons, contrasts singularly with the heavy, sombre character of the exterior of the Palazzo, with its lofty tower, and which was originally the seat of the Government of the Florentine Republic. Between the period at which Arnolpho di Lapo designed the building and Michelozzo adorned the Cortile, more than a century and a half had elapsed. A full description of this palace is given by Rastrelli :—"Illustrazione Storica del Palazzo della Signoria detto Palazzo Vecchio, Florence, 1794."

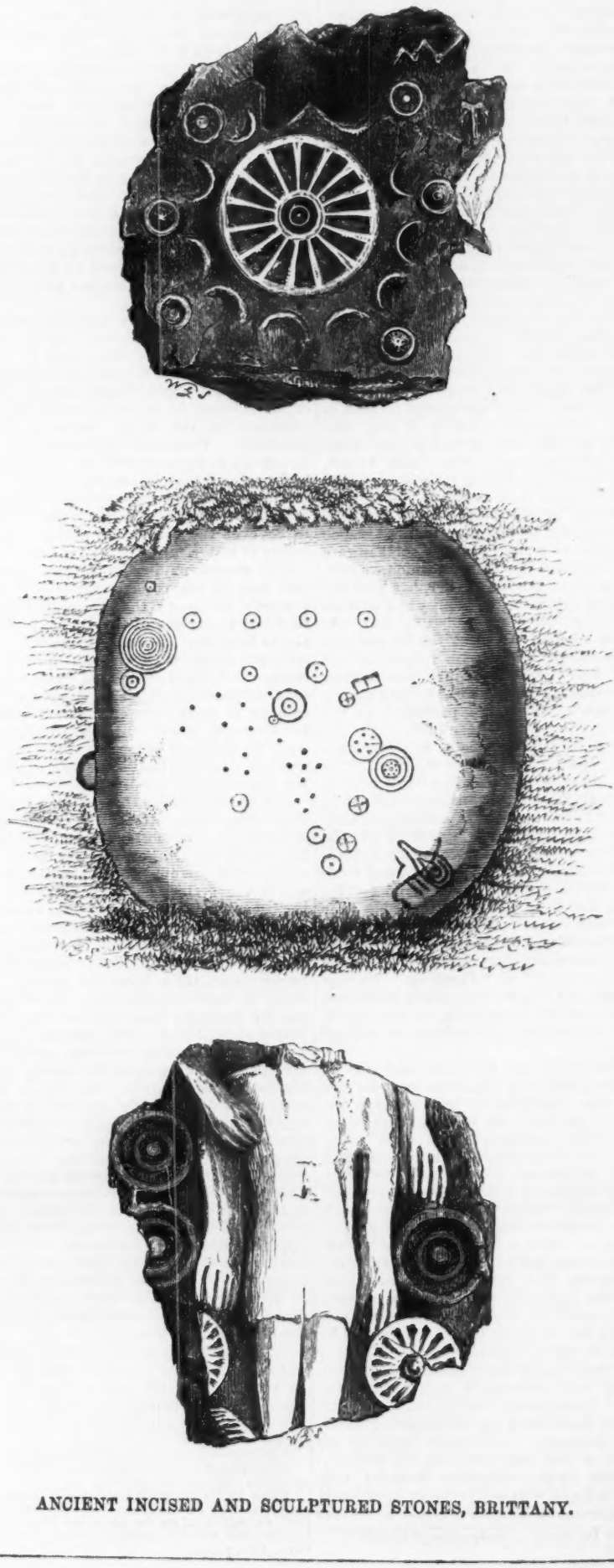
INCISED STONES.

IN anticipation of the paper on Brittany which I am to read before the British Archæological Association, and which will be fully announced, I beg to send you illustrations of some very remarkable objects which appear free from the vagueness apparent on the incised stones in this country. The incisions on the stone at Pleucadeuc, near Rochefort en Terre, are unmistakably astronomical. The tenon, if I may so term the projection on the west side of the stone, appears to have connected it with another hemispherical tablet now lost, and, as the great luminary is placed in the direction of setting,—*i.e.*, on the north-west of the stone,—an entirely opposite arrangement may have been on the other.

I will not go into a description of the planetarium, which speaks for itself, except to say that the object, in the form of a bisected oblong near the centre of the stone, has the appearance of being of a much later date. The stone is mentioned by a mere notice of its site by M. Cayot Délandre, and other French antiquaries. It is situated in a district where *débris* of the side monuments of the old stone age cover many square miles, and from which (the Morbihan) have been disinterred fragments of terra cotta bearing curious emblematic devices of Sabian worship, in which the moon takes a more prominent place, almost, than the sun, and which appear rather Asiatic than Roman, as seen in the illustrations. The character on the right of one of the fragments (the first), is the often-repeated figure in the incisions in the chambers of Loc Mariaquer, and appears in all its varieties to represent the T tau.

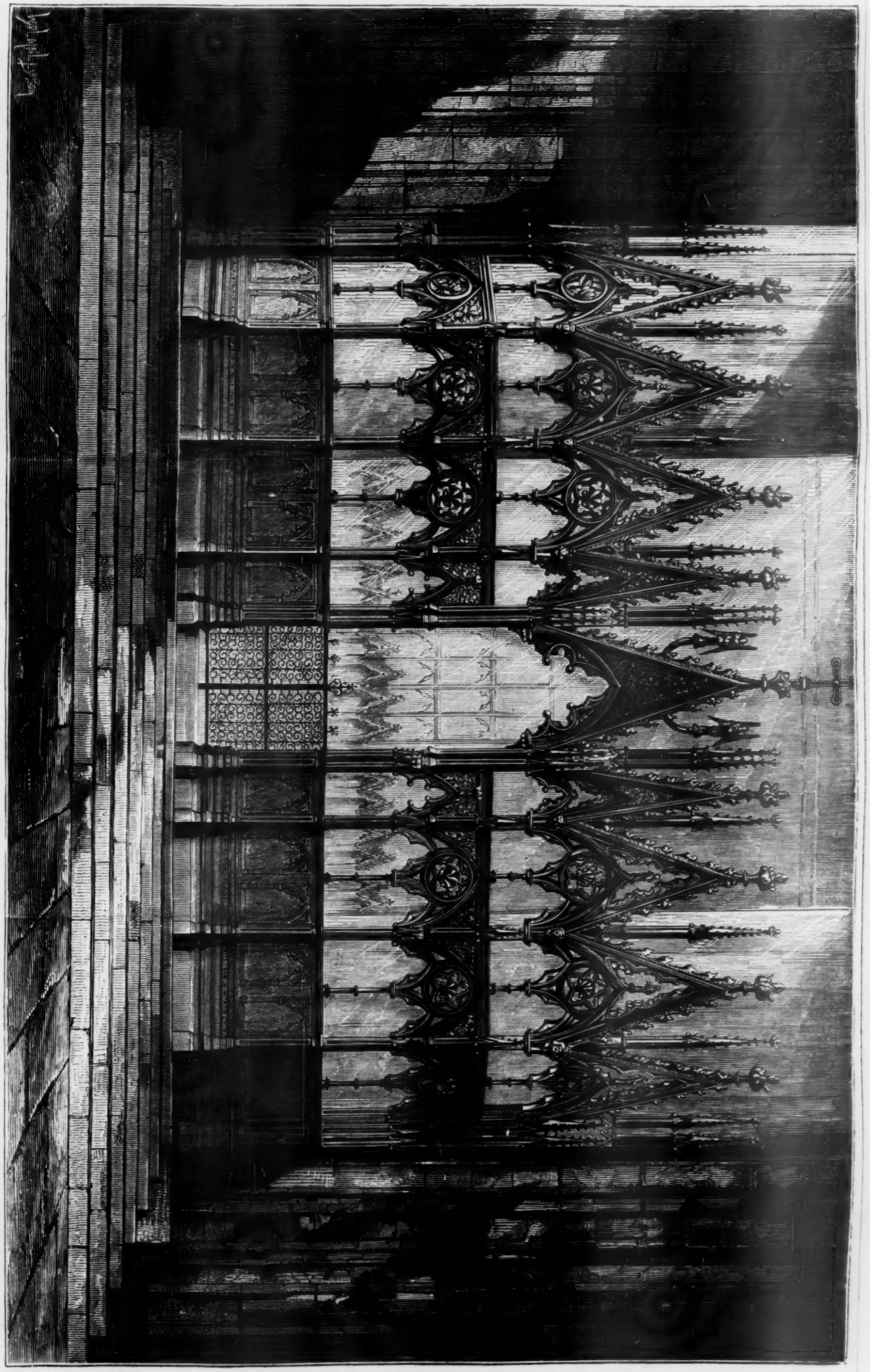
Some of your readers who propose to be present at the delivery of my paper may prefer considering these examples beforehand.

JOHN S. PHENÉ.



ANCIENT INCISED AND SCULPTURED STONES, BRITTANY.

CORTILE OF THE PALAZZO VECCHIO, FLORENCE.



CHANCEL SCREEN, EXETER CATHEDRAL.—SIR GILBERT SCOTT, R.A., ARCHITECT.

CORTILE OF THE PALAZZO VECCHIO, FLORENCE.

CHANCEL SCREEN, EXETER CATHEDRAL.

IN our last volume we illustrated the new choir-stalls, lately erected in Exeter Cathedral, by Messrs. Farmer & Brindley, from the designs of Sir Gilbert Scott, architect.* We now give a view of the chancel screen there, which has been executed by the same carvers.

THE HEALTH AND SEWAGE OF TOWNS.

CONFERENCE AT THE SOCIETY OF ARTS.

THE first of a proposed annual series of conferences on the health and sewage of towns commenced on Tuesday last, the Right Hon. James Stansfeld, M.P., in the chair. The conference commenced at 11 a.m., adjourned at 1.30 p.m. for luncheon, resumed at 2 p.m., and sat until 5 p.m. The programme included papers and discussions on: Firstly, water-carried sewage systems, sub-divided into (*a*) sewage farms, with or without precipitation or subsidence, profit and loss, and influence on health; (*b*) effluent waters: subsidence, precipitation, filtration; (*c*) disposal of sewage; (*d*) discharge into the sea; (*e*) under no special treatment: effect upon health. Secondly, dry systems: pails, pans, boxes, earth, ash, and other closets; their influence on health, cost, &c. Thirdly, foreign systems: Captain Liernur's and other systems, and the suggestions they offer.

The Chairman, in opening the proceedings, said he had been distinctly informed that it was not intended to discuss new and untried schemes or new scientific theories in reference to the disposal of sewage. The object of these annual conferences,—for it was intended that they should be annual,—was to take stock of the experience of different localities in regard to different systems which had been already carried out. They had first to deal with water-carried sewage, next with the dry systems, and lastly with foreign systems. The system of water-carried sewage struck one as that which was best adapted for large and dense populations. It seemed to recommend itself by a certain mechanical completeness and by a certain decency. It would not do to assume that if every house had well-constructed closets and pipes which were kept in good order, and if the pipes were properly connected with the public sewer, that would be a solution of the problem before them. Besides all that, there was the question of the condition in which the sewage was discharged at the outfall, and the necessity of treating it there in such a manner that in its collective form it would not be injurious to the health of the population. In the progress of modern civilisation they had created by their own handiwork insidious dangers in the shape of sewer gases which were entirely the product of the modern system of disposing of sewage, and which, coming back to the house through the sewers and drains, were a source of diseases which were almost unknown before. They could not expect to have a safe and effective system of water-carried sewage unless the sanitary authority in charge of that system was in charge also of the condition of the pipes and drains within the house itself. The dry systems had many things to recommend them. In the first place, they did not involve a large outlay of capital. They were somewhat troublesome in their working from year to year; but they had the advantage of giving a very speedy sign if there was any neglect, and that sign, though unpleasant, was not so insidious or dangerous as the imperfections of the water-carried system; resulting in the creation and introduction of sewer gases into the houses of the people. Such conferences as that would enable those who attended to compare notes as to the merits and defects of different systems under varying conditions as regarded population, and would tend to check extravagant expenditure. In concluding, the right hon. gentleman said he thought that there should be an inquiry department formed in connexion with the Local Government Board, which might be consulted on sewage questions by sanitary authorities, and suggested that until that had been done a similar department should, if possible, be originated by the Society of Arts. He also expressed his regret that the engineers connected with the Board were unable to attend the conference in consequence of being then engaged in preparing their reports on the sewage schemes.

* Vol. xxxiii., p. 975.

The following papers were read and discussed on Tuesday:—

The Wrexham Sewage Farm.

Hafod-y-Wern Farm, Wrexham, was hired from the Wrexham Local Board in February, 1872, by the present occupier, Col. A. Jones, V.C., having for two years previously been under the management of the Local Board, and although some steps had been taken to level part of the land, it had suffered considerably from neglect and mismanagement during these two years, which resulted in a considerable loss, and made the Board anxious to get rid of their charge.

The farm has a gross acreage of 84 acres, from which, after deducting 2 acres for roads, tanks, &c., there remain 82 acres available for cultivation. On taking possession of the farm, Colonel Jones was assured by every one that the land was saturated with sewage, that a larger extent was required for irrigation, and that the grass produced was rank, and unfit for cattle. Subsequent experience, however, has proved to him that these statements were incorrect. One grave defect in the previous management of the farm was the public nuisance caused by the use of a wide, deep, and uneven ditch for a sewage carrier, running as it did immediately beside a public footpath which traverses the whole extent of the farm; for this was at once substituted a 12-inch sanitary pipe in the adjoining field, with a syphon across a road, and slide junctions at intervals for letting out sewage as required, thus removing all cause of nuisance.

About two acres of this farm were prepared and used as filter-beds, on the Merthyr plan, during the first year; but it has subsequently been found unnecessary to waste any of the liquid sewage by such means, as it can always be used to greater advantage in wide irrigation.

The greater part of the sludge is sold to neighbouring farmers, at a rough estimate of 1s. 6d. per ton, after about three weeks' air-drying by the side of the tank, but the remainder is carted and spread upon adjacent land which lies above the level of the sewer-mouth. Colonel Jones's experience coincides with the analytical relative values commonly assigned to sludge and liquid sewage, and he finds, as might have been expected, that the latter produces its best results upon a good root of Italian rye-grass. This has yielded seven or eight crops per annum, with a nearly constant net profit of 15*l.* per acre over the whole area in Italian rye-glass, which has expanded each year with the market for this new commodity, from 3 acres in the first up to 17 acres in the fourth year from its introduction to the notice of Wrexham horsekeepers. . . . .

As a proof of Colonel Jones's confidence in the advantages of sewage irrigation, it may be added that he recently offered to take a lease of the West Derby Farm (200 acres, with sewage from a population of about 20,000) at the usual rent of adjoining land, proposing to occupy his spare time in superintending this new farm, in addition to the one which he has now got into pretty regular working order at Wrexham, although the two places are separated by about thirty miles of railway.

The Beddington Sewage Farm.

The following paper was submitted by Dr. Alfred Carpenter:—

It will be interesting to this Conference to know the actual cost which the Beddington Sewage Farm has entailed during the past ten years upon the ratepayers of the parish of Croydon. I obtained the information as to the actual figures from the accounts which have been year by year published, according to law, by the Local Board of Health, and which accounts have been audited by the Government auditor. They show receipts and expenditure only, and are not a correct view as to profit and loss, such as an accountant would draw out, but they show the real burden which has been entailed upon the parish of Croydon by the utilisation of the sewage upon land. There will not be much difficulty in apportioning the items to their proper position in the matter.

The first portion of the farm was laid out as a sewage farm in the year 1860; it was taken on lease by the Board when they were in great straits and under heavy penalties; the then leaseowner was paid out at some cost, and the land laid down for the purposes of irrigation in the cheapest possible way. It was then leased for a term of years to Mr. Marriage. The accounts as published commence with a simple statement of receipts from Mr. Marriage, and of rents paid to the ground landlord. How Mr. Marriage fared cannot be shown, but if his evidence, as given to the Commissioners appointed to investigate the subject of the utilisation of sewage, is to be considered as correct, he was not dissatisfied with the result. In addition to these simple sums, there is a charge on the one side of wages paid to a herd of foremen employed by the Board, who made a daily report as to the condition of the effluent water at the outfall, and also the costs incurred in straining the sewage of its more solid matter before it passed on the land. On the other side is placed to the credit of the Local Board the sum which accrued by the sale of the solid manure thus obtained.

The year 1871 shows a great increase in the amounts. The rapid growth of the town of Croydon soon made the 300 acres which were used for the purpose quite unable to cope with the quantity of sewage which reached the outfall. It became necessary for the Board to acquire extra land. The negotiations for this purpose were conducted as such negotiations generally are when the negotiators are bidding for popular favour. The shadow is grasped instead of the substance, and the interests of the parish were sacrificed. Everything connected with this negotiation was publicly known, the owners of the property knew the position of the Board, and, with their own agents among the members of the Board, they knew how much rent it was possible for them to get, without any reference to the real value of the land. The Board, advised by their engineer, declined to deal with Mr. Marriage, but leased the whole of the farm to a company, which was ostensibly got up for the purpose of taking it over, and was called the Croydon Sewage Farming Company. Arrangements were made that the company should pay rent in advance, on somewhat corresponding terms with those under which Mr. Marriage held the land, which appeared to make the Board stand in the position of receiver of rents, paying them over at the end of each quarter to the ground landlords. The company paid no valuation for going in beyond sums for ordinary fixtures and small matters left in the land by Mr. Marriage. The company commenced their work with a real capital of 1,500*l.* (the nominal being 10,000*l.*), sufficient to pay the first quarter's rent. They borrowed money of their bankers to pay their wages' sheets instead of making calls, paid handsome sums to their directors, clerks, managers, and other advisers; then 15 per cent. dividend on their first year's work, nothing whatever on the second, and collapsed altogether on their third. The Board had then to step in and become the actual managers of the farm, after it had been allowed to get into a ruinous condition by those who were totally incompetent to look after so large an interest. Good fortune, however, even now did not forsake them, for while they paid no valuation on going into the land, the lease had been so drawn that when it ended they were to receive a valuation according to the custom of the country, and under that clause the arbitrators and umpire again saddled the Croydon ratepayers with an enormous sum as valuation; and in the payments for 1874 figures the sum of 5,238*l.* paid to the receivers of the farming company,—a large portion of which ought never to have been paid at all,—consisting of items for rye-grass cultivation, rents, and fallows, which were not paid for when the company took possession. However, the substantial shareholders in the company were some of the inhabitants of Croydon, and they got back a large part of that which they had invested, notwithstanding the heavy items with which the management has been weighted. The tables show that the receipts which have been obtained by the Local Board, amount to the aggregate sum of 39,317*l.* 14*s.* 3*d.*, whilst on the other side the payments have been 50,605*l.* 13*s.* 4*d.* This total shows a balance against the ratepayers of 10,891*l.* 19*s.* 1*d.*; this item, however may be fairly reduced by the sum of 5,450*l.* 2*s.* 7*d.*, which was the valuation of the stock, produce, and fixtures on the farm, on the 25th of last March, according to a valuation made by the farm manager, and which is on the basis of that allowed to the company. This table gives, therefore, an average loss of 500*l.* a year. I have appended the details of the past two years, from which it will be seen that a local board labours under very great disadvantages in carrying on a business like a farm. The wages sheet alone will prove this, for there is no one whose pecuniary interest it is to keep down the expenses. Idle hands are retained, and every man's

hand is against the Local Board, and in favour of the private individual, whilst the managers themselves, as soon as they become aware of the work that is before them, make violent enemies of those men whom they have prevented from fattening on the rates. But they make few active friends among the better class of the community, who decline to take part in local politics. The result is that at the next election the management is changed, and most of the advantages of former experience are lost. Still, notwithstanding all the disadvantages of the case, and taking the last year as a guide, it will be seen that the balance against the parish upon the working of the farm is 2,317*l.* 13s. 8d., but against that may be set off the increase in the value of stock upon the farms, which amounts to the sum of 775*l.*, leaving a charge upon the rates of about 1,542*l.*; this amounts to the sum of a little more than one penny in the pound upon the rating of the parish.

It is right to mention that no account is taken of the purchase of sixty-five acres of the land in question, which is now the freehold of the Local Board. For this land 8,000*l.* were paid, and a rental should be charged on account of it. Nothing is charged in the accounts for expenses incurred in laying out the land in the first instance, which cost 4,010*l.*; and no account is taken of the first outlay for sewers. These would have to be made under any system of sewerage, and should not be taken account of in weighing the pecuniary merits of a sewage farm. If, however, it would be thought right to charge for laying out the land, and a rental for the freehold, a further sum of 750*l.* a year must be added, raising the total cost of the farm to a rate of something under 1¼d. in the pound upon the rateable value of the parish. Against this, however, may be put, as a set-off, the fact that there are expenses which have been incurred in the first years of the farm of the character of unexhausted improvements, which will, year by year, be adding to the income, whilst the expenditure will not again recur. I should have said that the land is leased for twenty-one years from 1871; long before that time is out I trust the utilisation of sewage will be so understood as to render it unnecessary for a renewal of the leases upon the present onerous and unsatisfactory basis. If the whole of the land had been obtained on the same terms as were the fifty-six acres before alluded to, the whole of the sewage of Croydon would have been utilised without any cost at all to the inhabitants of Croydon; and even now, if the farm could be managed in a satisfactory manner, the receipts would be quite equal to the payments, notwithstanding the rental of 10*l.* an acre, which has to be paid for a large portion of the land.

One word, in conclusion, as to the effect upon the health of the district in which the farm is situated. The last return of vital statistics shows that 26 deaths and 60 births have been registered as occurring in the sub-district during the past half-year. This fact bears a most important relation to the working of the farm. The neighbourhood is yearly increasing in population, rateable value, and general health, notwithstanding the fact that during the past year the farm has had to provide for and utilise the sewage of a very large number of persons who have suffered from typhoid fever,—a fever which has been mainly induced in Croydon through an interference with the water-supply of the district. The births in Croydon itself for the month ending April 29th last have been 96, whilst the deaths have numbered 35, and typhoid is now entirely absent from the list. The farm has, however, utilised and rendered innocuous all the typhoid excreta from nearly 1,000 cases which have reached it since January, 1875, without the least injury to the inhabitants of the sub-district itself; but that part which was retained in badly-constructed sewers in Croydon, and had an opportunity given it to change the form of its elements, produced much mischief to those who had the misfortune to live upon the lines of the badly-constructed and imperfectly-ventilated sewers. My own impression is still, that the sooner sewage is conveyed to the country and at once utilised the better for the town. The receipts and vital statistics now published, I think, prove that it is also no drawback to the land itself. There is one other point worth mentioning, as decreasing the value received from the farm,—the great amount of water which has had to be dealt with during the past year has decreased returns. Excessive flushing of sewer and heavy rainfalls, much of which still passes into the Croydon sewers, have taxed the land to the uttermost. This year will see an improvement in that direction; a large part of the surface-water will be abstracted from the sewers and sent into its proper channels. The market gardening also has been given up in consequence of the impossibility of a local board dealing properly with such grounds. I look, however, to the accounts for the year now commencing as likely to give a better idea of what a sewage farm will be able to do under present management than any that has as yet preceded it.

Notes on the Eton Sewage Farm.

Eton, with an urban sanitary district of about 3,500, including the school, was the first town on the upper Thames which diverted its sewage from the river. It is drained on the separate system, viz., the exclusion of all surface and storm waters from that of the sewage; this exclusion has been successfully effected, although the exclusion of subsoil waters, owing to broken pipes or imperfect joints, has not been quite so successful, as in the case of subsoil water being raised by floods, an addition of about one-fourth the time required for pumping is necessary.

The receiving tank is situated about 1,000 yards below the nearest houses in the district, 600 yards above the tank is an outlet to the river for use only in cases of absolute necessity, but which is not now required, as the engines and pumping machinery are in duplicate. The rising main that carries the sewage to the farm is 1¾ mile in length, about 80,000 gallons being pumped through daily, taking on an average from five to seven hours, which time is divided between the morning and the afternoon.

The farm, consisting of about 40 acres, of which some 30 acres only are laid out for irrigation, is situated at a distance of half a mile from the river; the soil is very light, with a depth from 1 ft. to 3 ft. of vegetable mould (irregular from levelling), overlying fine alluvial gravel and sand, the upper surface about 10 ft. to 12 ft. above the ordinary level of the river; one-third of the land laid out for irrigation is cropped with rye grass, one-third with root crops, and the remaining third with cereals; this last, however, not being irrigated; thus it will be seen about 20 acres only are irrigated in each year.

The Rev. C. Wolley Dod, chairman of the Eton Local Board, to whom the Conference is indebted for these notes, states that the system has now been in successful operation for six years, yielding an annual profit from the working of the farm of about 120*l.*, equal to a rental of 3*l.* per acre. Milk (fed on the sewage grass) is said to be of very good quality.

At a depth of about 8 ft., more or less, the subsoil water is reached, yet under no circumstances is there ever one drop of effluent water from the land. Agricultural pipes laid some 4 ft. deep in a road across the middle of the farm never run a drop; in fact, everything put on the land, even in the wettest weather, is absorbed at once: a whole day's pumping of 80,000 gallons has been run upon a space of about 3 square chains, when all disappeared in less than an hour after pumping had ceased.

It is found very difficult to distribute the sewage evenly; in winter, when no growth has taken place, as also in summer, with the root crops a large proportion of the sewage must escape root action, and descend to the subsoil unpurified, except by filtration through the soil and gravel. What then becomes of it is a problem of great importance, although in the comparatively small quantity dealt with at the Eton farm, on so large a surface, the question hardly arises; yet as towns in the Thames valley seem to be for the most part adopting the system of sewage irrigation, and in consequence of the disappointing results financially of sewage farming, will probably be disposed to put as large a quantity of sewage as possible on a small surface of land.

We gather, therefore, from the above-mentioned facts, taking the population of the district in rough numbers at 3,000, that 1 square chain will absorb the sewage of 1,000 people, thus giving with sufficient pumping-power an absorbing capacity of 10,000 gallons per acre in six hours, or 40,000 in the twenty-four hours; but of course this could not last.

The subsoil water is generally presumed to flow in a course more or less parallel to the river, although no positive proof of this is obtainable. It is stated in a paper on the subject by Mr. Menzies, that at Old Windsor he found the subsoil water moving parallel with the river at the rate of about half a mile in the twenty-four hours but his experiments, he also mentions, were made when the river was rising rapidly. The question is an important one, whether the sewage, after sinking vertically to the subsoil water, at a depth of 8 ft., continues to sink, or at once begins to flow horizontally. The permeable strata underneath are of unknown depth. The alluvial drift is estimated in the Ordnance Geological Report at from 30 ft. to 60 ft., immediately below which comes the chalk.

Last year attempts were made at Eton to trace the course of the upper subsoil water; holes were dug on the farm to the subsoil, and filled with sewage, into which was put chloride of lithium. Samples of the water from the neighbouring wells, examined with the spectroscope, gave no result; holes were then dug within a few yards of the first holes, but the subsoil water from these showed no trace of lithium; it is possible, however, that the chloride of lithium may have been converted into the oxide or carbonate, and so remained fixed. The experience at Eton, therefore, rather leads one to suppose that the width and depth of the volume of subsoil water all round the farm is so great, that the effect of the sewage, so far as analytical tests are concerned, would be lost almost directly, and that samples of the subsoil water taken on the line of its flow, 100 yards above and 100 yards below the farm, would not show any appreciable difference.

Mr. Whitehouse, the surveyor to the Local Board of Eton, said, in reply to a question by the chairman, that the statements in the foregoing paper were correct.

Precipitation Processes at Coventry, Nuneaton, and Kenilworth.

Mr. J. C. Melliss, C.E., described the treatment of sewage according to the processes of the General Sewage and Manure Company (Limited), at Coventry, Nuneaton, and Kenilworth. It appears that previously to the construction of the present works, the whole of this sewage was, in an undefecated state, cast into the river Sherburne, at a spot a mile from the town. It rendered this stream black and disgusting, and a terrible nuisance to the neighbourhood, as well as a great source of danger to health, inasmuch as the sewage, at some few miles' distance, found its way into the source of the water-supply to the town of Warwick. All this has now been remedied; the river Sherburne has been so purified that fishes have returned to its waters, the Corporation of Coventry has been relieved from litigation and annoyance over its sewage, and, with the surrounding landed proprietors, is perfectly satisfied with the results obtained.

The following brief account of the operations will explain the works and various processes by which this has been accomplished.

In selecting the site, advantage has been taken of a small fall (about 6 ft.) in the nature of the ground, to avoid the costly expedient of pumping the sewage, and to work it throughout by gravitation. A narrow strip of comparatively valueless land along the border of the Sherburne, in extent about thirteen acres, has been thoroughly drained, embanked against the rising of the river during floods, and made available for the whole of the works. The sewage is subjected to four processes, viz.:—1. Strained; 2. Chemically treated and precipitated; Effluent water filtered; 4. Precipitate or sludge, dried and disposed of.

The straining is effected by means of mechanical strainers, known as "Latham's Solid Sewage Extractors." The solids thus removed form a rich manure, which, at the present time, is used in the orchard adjacent to the buildings of the works. The strained sewage thus free from all its grosser contents, and, therefore, in a better condition for chemical treatment, next passes through a block of buildings, where it receives continuously an addition of a solution of sulphate of alumina, manufactured and prepared in a cheap way at the works, which contain all the necessary appliances for this purpose. The sewage next receives a small addition of milk of lime, and, after the addition of each chemical, the whole mixture is thoroughly agitated. The mixture then passes on to the precipitating tanks, of which there are four, three being in use at the same time, while a fourth is being cleaned out daily. Precipitation takes place in these tanks while the effluent water flows in a thin sheet from the surface, first, over weirs extending quite across the tanks; and, secondly, over weirs which extend halfway across each tank.

An arrangement of sluices and valves exists at the end of each tank for drawing off the water from the precipitate or sludge when the tank has to be emptied.

The effluent water is conveyed from the tanks by a culvert and open carriers to filtering-beds, of which there are three, each three acres in extent; the water then percolates through a depth of 5 ft. of earth, and is afterwards discharged through three 15-in. mains into the river. This water is clear, bright, and of a good standard of purity, and, according to analysis by Dr. Voelcker, contains in each imperial gallon, 45·22 grains of solid matter, and only ·630 of a grain of free (saline) ammonia, and ·042 of a grain of organic (albuminoid) ammonia.

The filter-beds are used intermittently, and are cropped with osiers and rye-grass. The latter is pleasing to the eye, and assists in keeping the beds in good condition.

The sludge or deposit found on the bottoms of the precipitating tanks, after the water is drained off, contains about 85 per cent. of moisture, and amounts during 24 hours to about 25 tons. It is one of the chief characteristics of this process that scarcely any solid matter is permitted to enter with the chemicals. The sludge, therefore, is almost entirely derived from the sewage, and is thus reduced to a minimum bulk. This fact renders it much less difficult, and less costly to dispose of than the large quantities of sludge which result from the lime and other precipitation processes, which require large quantities of chemicals with their solid portions to enter the sewage.

The sludge is swept from the bottoms of the precipitating-tanks into underground chambers placed below their level, in which simple arrangements exist for drawing off supernatant water; it is then elevated by ordinary chain and bucket elevators, and passed through Milburn's continuous sludge-filters, which, without the application of heat, remove about 20 per cent. of moisture, and reduce its bulk to about 10 tons per day. The sludge in this somewhat stiff condition, containing about 65 per cent. of moisture, is next subjected to a comparatively small amount of heat in Milburn's sludge-drying machines, which remove a further 5 per cent. of moisture. It is a remarkable fact that this sludge thus treated, and having been once subjected to heat, continues afterwards, when placed in heaps, to part with its moisture until it retains only nine or ten per cent.

By these means the daily precipitate at Coventry is converted into about 4½ tons of a dry manure. This manure, according to analysis by Dr. Voelcker, contains, in addition to other fertilising agents, 1·67 per cent. of ammonia, and 3·75 per cent. of phosphate of lime, and may be valued according to chemical values at 35s. or 40s. per ton.

The whole of the sludge is not, however, reduced to a dry condition in the manner just described. Some portion of it is, after passing the non-heating continuous filter, fortified and dried by the addition of chemicals and fertilising agents; thus producing a good manure which is brought up to an average value of 5*l.* or 6*l.* per ton, and competes well with the best artificial manures produced in this country. A considerable quantity of the sludge is also, in the stiff and semi-dry state in which it comes from the non-heating continuous filter, bought and carted away by the landowners in the neighbourhood. By these several modes the whole of the sludge can be disposed of, partly by local and inland arrangements, and partly by exportation; and thus is avoided the one great difficulty of all other precipitation processes.

The sale of sewage manures has undoubtedly been slow and gradual, they did not at once find a ready sale; but now that the price demanded is a fair one, and confidence in their value, so long disturbed by exaggerated statements, is restored, there is every reason to believe that the whole of the sludge can be utilised and sold.

The cost of purifying the entire sewage of Coventry, in the manner thus described, inclusive of rent of land and interest on capital, and without deducting any receipts for sale of manure, is about 1s. 7d. per head of the population, per annum. Taking, however, into account the chemical value of the manure produced, the cost would be about 2d. per head per annum. In either case, the primary cost of purifying sewage at Coventry is considerably less than that of disposing of it by irrigation. There are many instances which prove this, but the following will at present suffice. The sewage of Warwick and Leamington is disposed of by irrigation; neither of these towns has a manufacturing population, and consequently a sewage less costly to purify than that of Coventry, but in the former town the cost appears to be 3s., and in the latter, exclusive of the privilege of putting the sewage on to 1,000 acres of Lord Warwick's land, about 1s. 6½d. per head of the population, per annum. In other places the cost appears to be as follows:—Banbury, 1s. 7d.; Northampton, 1s. 8½d.; Tunbridge Wells, 5s. 3d.; Croydon, 2s. 1½d.; Merthyr Tydvil, 1s. 8½d.; Norwich, 3s. 6d.; Eton, 5s. 1½d., per head of the population, per annum.*

The success attending the purification of the Coventry sewage is testified to by those having property along the banks of the river, tenants of Lord Leigh, lord-lieutenant of the county, and others, as published correspondence shows. It is also strikingly evidenced by the fact that two manufacturers at Kenilworth (one a tanner, discharging 5,000 gallons, and the other a fellmonger, discharging 50,000 gallons of refuse daily into the Finham brook, which, like the Sherburne, is one of the tributaries of the River Avon), have taken a licence of this company, and are now erecting the necessary works to purify, at their own expense, their refuse by the same processes as are used at Coventry. The cost of purifying the tanner's refuse will be about 10d., and that of the fellmonger's about 2s. 6d. per day, leaving altogether out of consideration the value of the precipitated matter.

Coventry, its Drainage and Sanitary Condition.

The following paper, by Mr. E. A. Purnell' City Surveyor of Coventry, was taken as read:—In the year 1850, Coventry, like many other places, was compelled to take steps to improve its sanitary condition; the first step was to have a good survey made of the city, which was done by the Ordnance surveyors; and upon its completion, the late Mr. Ranger, C.E., was engaged to devise a scheme of sewage which was completed in 1854, the outfall being into a small river called the Sherburne, about one mile from the town. As the private drainage works developed themselves, great complaints began to be made about the foul state of the river, and in 1857 it was decided that filtering-tanks should be constructed, which was done, at a cost (including four acres of land) of about 4,000*l.* In 1858 these tanks were completed and used, the sewage passing through vertical filters, composed of coarse gravel, about 3 ft. in thickness; in addition to this, the lime process was adopted, but after being tried for some considerable time it was abandoned, not much benefit to the river being derived from it. As the present drainage increased, so did the complaints about the effluent water, and in 1865 a meeting of the landowners along the course of the Sherburne, below the outfall works, was held at the King's Head Hotel, Coventry, and a request made from them to the Corporation requiring an abatement of the nuisance. Things went on in the same unsatisfactory condition until 1868, when the Corporation purchased about 267 acres of land for the purposes of irrigation; this land adjoined the outfall, but the greater portion of it is hilly, and the sewage would have had to be pumped to a height of 150 ft. Mr. Thomas Hawksley, C.E., was employed by the Corporation to report upon the cost of laying out the land as a sewage-farm, but his estimate was so high that the Corporation shrank from embarking in so serious an undertaking, and matters still remained as they were. In 1869 the Corporation advertised the farm and sewage to be let on lease, unavailingly; for, although several applications were made, nothing came of them. In 1870 proceedings were threatened by the landholders adjoining the river, and the Corporation entered into negotiations with the Peat Engineering Company, and also the A B C Company; but, after long correspondence, they were abandoned by both companies. At this time Dr. Anderson commenced experiments at the works, and in 1872, the General Sewage and Manure Company, having arranged with the doctor for his patents, made arrangements with the Corporation for a concession of the sewage to the company for twenty years. In 1873 the works were commenced, and in April, 1874, they were completed. A detailed description of the buildings, and mode of manipulating the sewage, will be found in the *Builder* of the 26th of February last.

* These figures are obtained from a return of sewage purification compiled by the Corporation of Rochdale, the published accounts of local Boards, and other public documents.

The works have now been in operation for two years, and during that time no complaints have been made by the landowners; in fact, the company's operations have had a most beneficial effect upon the river. With respect to the financial results, I am unable to give any information, as, although the company have placed their books at my disposal at any time, I have been unable to avail myself of their offer.

A few facts concerning Coventry may not be uninteresting. The population of the city is 40,000; rateable value, 101,000*l.*; cost of sewage, 33,000*l.*; number of water-closets, 4,510; number of privies, 800; and the effluent sewage, as ascertained from gaugings, extending over a period of fifteen months, was 1,800 gallons per day; this quantity, in consequence of building operations, and a great improvement in the city, no doubt amounts now to 2,000,000 gallons per day.

The city is supplied with water from artesian wells, sunk in the new red sandstone, four in number; one of 410 ft., one of 300 ft., and two of 75 ft. in depth. Thus water rises in a tank, 100 ft. in diameter, and 16 ft. in depth, and is pumped to a height of 140 ft. into a service reservoir, commanding the highest part of the city. The number of houses supplied is 8,419, and the average quantity of water 700,000 gallons; no charge is made for water-closets. The cost of the water-works was about 36,000*l.*

We propose, next week, to notice some other papers read before the Conference, as well as to give a condensed report of the discussions which ensued on the foregoing and succeeding papers.

VALUE OF SHARES IN THE NEW RIVER COMPANY.

AN unusually large company of capitalists and others were present at the Auction Mart, Token-house-yard, on Friday, the occasion being the sale, by Messrs. Fox & Bousfield, of twenty-one shares in the New River Company, known to be one of the most prosperous water companies in the metropolis. The property consisted of one fully paid-up 100*l.* share, and twenty 100*l.* shares, on which 60*l.* are paid. The latter were divided into ten lots of two shares each. The particulars stated that the company was the most valuable trading corporation in the world, with a revenue which had the security of Consols. The dividend last Christmas was ten per cent. on water rents, in addition to which there was a further dividend from the rents of land and houses belonging to the company, and the revenue was constantly increasing, which rendered an augmented dividend a matter of certainty. In order to set before them the continually-increasing revenue of the company, the auctioneer stated that the income seventeen years ago was 150,000*l.*, and that last year it was 258,000*l.* A gentleman present inquired if a call of 10*l.* per share was not about to be made. The auctioneer replied in the affirmative, but observed that it only served to prove the increasing value of the property. The call was required for the execution of new works which were now in course of construction, in order to furnish the additional water supply, in constant demand; and it must be borne in mind that while the call was made at par the shareholders had a certainty of receiving ten per cent. dividend upon the amount. He believed there would soon be a still further call, and he was certain the shareholders would be glad to pay it. The shares were then submitted for sale, the first lot offered being the 100*l.* share fully paid up. The first bid was 200*l.*, the biddings following upon each other in rapid succession until 300*l.* was reached, at which sum the lot sold, being 200 per cent. premium. The next ten lots in two shares each, of 100*l.* and 60*l.* paid, were offered in succession, and realised 235*l.* and 240*l.* per share each, representing a premium somewhat higher than that realised by the first lot. The purchaser of the first two shares offered to take the whole of the remaining lots at 235*l.* per share, but this proposal the auctioneer was unable to accept.

Society for the Encouragement of the Fine Arts.—A *conversazione* was held on the 11th of May at the Picture Galleries, South Kensington Museum. A morning meeting, on Thursday, the 8th of June, will be held at Dorchester House, Park-lane, W., by permission of Mr. Holford, between the hours of eleven and two.

THE INSTITUTION OF CIVIL ENGINEERS.

AT the meeting on the 2nd of May, the paper read was on "Fascine Work at the Outfalls of the Fen Rivers, and Reclamation of the Foreshore," by Mr. W. H. Wheeler, C.E.

It was stated that the four rivers which take the drainage of the Fens of Lincolnshire and Cambridgeshire, and the lands bordering thereon, discharged into an estuary filled with large beds of shifting sands, and that in order to secure an outfall for these rivers it had been necessary to train their channels through the sands. The most economical way of accomplishing this had been by means of training walls, constructed of fascines and clay and chalk. Very beneficial results had followed from this training and straightening of the outfalls, and the low-water mark had been lowered several feet. The advantage of confining the rivers to one course was shown by the fact that when in the trained portion of the channels there was a depth of 10 ft. at low water, below it there would be a depth of only from 2 ft. to 3 ft. The faggots used for building the training walls or jetties were made from thorns cut from the hedges, tied together with tarred string. The length of each faggot was 6 ft., and its girth 3 ft. These were thrown into the water from barges and weighted with clay, layer after layer being thus placed, until the jetty was brought up to half-tide level. The depth of water in which these jetties had been built varied from 10 ft. to 20 ft., the top being about 6 ft. above low water. The base of a jetty 16 ft. high was 22 ft. wide, and the top 13 ft. The cost per lineal foot for the work done on the Witham averaged 19*s.* 3d., or 1*s.* 8d. per cubic yard, the details of which were given. The thorns and clay together formed such a compact mass, that the jetty was able to withstand the force of both the ebb and tidal currents, and was a cheap and effective means of carrying out the training of these rivers.

After the formation of the jetties, the sand and silt accumulated at the back, and ultimately grew into green marsh. The accretion of land was gradually taking place all along the foreshore of the Wash, but to a much greater extent on the Lincolnshire than on the Norfolk coast. The process of accretion was very slow, unless assisted by artificial means. A marsh, under favourable circumstances, would reach a stage fit for enclosure in about thirty-five or forty years. The process of accretion might be hastened by placing faggots across the foreshore to break the force of the water and so assist in the deposit of warp, and by inoculating the ground with sods cut from the adjoining marshes. The value of the salt marshes for feeding sheep before enclosure was from 5*s.* to 6*s.* an acre, and the value of the freehold 20*l.* The cost of enclosure was from 15*l.* to 20*l.* an acre, and the value of the land after enclosure from 50*l.* to 60*l.*

VENTILATION.

SOCIETY OF ENGINEERS.

AT a meeting of the Society of Engineers, held on the 1st of May, in the Society's Hall, 6, Westminster-chambers, Victoria-street, Mr. V. Pendred, president, in the chair, the first paper read was "On Flues and Ventilation," by Mr. A. H. C. Trewman.

The second paper read was "On the Ventilation of Buildings," by Mr. J. W. Pearse, and in which the author described some of the leading appliances for that purpose. He first referred to the vertical system of ventilation revived by Mr. Tobin, in which fresh air is admitted into the room by vertical pipes communicating with the outer air and reaching nearly to the ceiling. In this system holes or slots in the lower rail of the upper window-sash are, in some cases, substituted for the vertical pipes. Mr. James Livesey, the author observed, purified the air before allowing it to enter the room, by causing it to be deflected on to the surface of a tray of water, which also had the effect of cooling it. Mr. John Currall, in his system, makes an aperture in the lower part of the window for the admission of fresh air, and another in the upper part for the escape of foul air. When there is a chimney in the room he introduces the fresh air by an aperture in the lower part of the door, and takes off the vitiated air by a ventilator in the chimney breast. Mr. M. J. Landau has designed a ventilating cowl, terminating at the top in a series of horizontal annular plates. The wind blowing across the plates induces a current up the shaft. Fresh air is admitted by a horizontal pipe closed at the outer end, but provided with annular plates and fixed in an outer wall. For extracting foul air from buildings or drains, Mr. E. G. Banner has invented a swivelling cowl, which has a bell-mouth, and is always directed towards the wind by a vane. The shaft is continued by a bend inside the tail of the cowl and swivelling with it. There is an annular space between the two tubes in which the air entering the bell-mouth is compressed, its subsequent expansion inducing a current up the shaft.

METROPOLITAN COWSHEDS AND DAIRIES.

THE following are the chief points in the proposed bye-laws for the regulation of the metropolitan cowsheds and dairies, which are now under the consideration of a sub-committee of the Society of Medical Officers of Health. The proposed rules were drawn up by Dr. T. O. Dudfield, M.O.H. for Kensington, whose labours in regard to the slaughter-house regulations have been considerable:—

Every cowshed shall be properly lighted and ventilated by louvred lights. The inner walls, doors, and woodwork shall be covered with hard, smooth, impervious material to the height of 5 ft. from the floor. The trough-manger shall be of impervious material, and sloped to allow of being easily cleansed. An impervious water-tank, closely covered, and provided with overflow-pipes unconnected with any drain, and the water procured from a water company where practicable. A proper place shall be provided for the storage of fodder, and where grains are used the receptacle shall be in two partitions to allow of cleansing, and shall be also properly drained. A properly covered place for the reception of dung shall be provided, made of cement, and thoroughly drained. No alteration shall be made in respect to paving, drainage, and ventilation, without the consent of the Local Sanitary Authority. No water-closet, privy, cesspool, or urinal, shall be within, or communicate directly with, a cowshed, and no inhabited room or workshop shall, on any pretext, be situated over it.

The space for each cow shall not be less than 800 cubic feet; single stalls shall not be less than 4 ft. in width, and double stalls 7 ft. 6 in.

In estimating the cubic space, no height of the shed in excess of 16 ft. shall be taken into account. The sheds shall be kept in good repair, and thoroughly cleansed at all times, and limewashed every three months at stated times. The dung to be removed daily in properly-constructed vehicles. No fowls or any other animals but cattle to be kept in the sheds. The other provisions are for the purpose of preventing the spread of infectious disease among cattle, and of prohibiting all persons who suffer from such diseases being employed in the cowsheds; the separation and quarantine of unhealthy cows, the storage of milk, and cleansing of the vessels which have been used; and provide that the sanitary authorities shall be duly informed in the case of foot-and-mouth and other contagious diseases.

The foregoing rules are to apply to the existing dairies. For newly-erected sheds and dairies, more stringent rules in the matter of isolation of the building, the providing of infirmaries and quarantine sheds for sick cattle, and depositing plans of proposed buildings with the authorities; the use of concrete flooring, and impervious material for lining the walls, is insisted upon.

Whether the foregoing regulations be adopted in their entirety or not, there can be no two opinions as to the urgent necessity which exists for the better regulation of the London and suburban dairies. As a conveyer of the germs of contagion, milk stands almost unrivalled.

UTILISING THE TIDE.

THE tide, though a very bad master, is capable, like fire and the other great powers of nature, of being transformed into a most useful servant. That comparatively little use is made of it at present, every one will allow. Beyond floating barges and pleasure-boats up rivers, and helping larger vessels out of dock or harbour, the uses to which the tide has hitherto been put by man are very inconsiderable indeed. Yet its power is immense. This may be readily seen from the fact that for every square yard of tidal surface, a rise or fall of 1 ft. represents the rise or fall through half the distance of 5 cwt. Moreover, the power of the tide is as the square of the height to which it rises (measured from the preceding low-water line). Thus the rise of a square mile of tidal water 1 ft. in six hours is equivalent to the work of an engine of seventy-three horse-power; but the rise of a square mile of tidal surface 20 ft. in the same time, is equivalent to the work of an engine of 29,200 horse-power, because not only is the distance accomplished twenty times as great, but twenty times as much water is raised. Now the rise of the tide at London Dock varies from 19·39 to 22·82 ft., and at Sheerness, from 22·96 to 25·63 ft.; and between these two spots are miles and miles of tidal surface which are made little or no use of at all, except for purposes of navigation. What a waste of power is here! It is true, plans have been proposed, and in part adopted, for utilising the force of tidal streams. Mills with ordinary undershot water-wheels have been mounted on barges, so as to preserve the same degree of immersion, and soas to swing round as the current is reversed. But if this plan were adopted to any extent in such a river as the Thames, not only would navigation be seriously interfered with, but the dreaded floods would be rendered all the more probable. Any scheme which proposes to utilise the tidal force of the Thames must at least be devoid of these two faults. And that scheme is most likely to meet with approval which, whilst in no way interfering with navigation, actually lessens the probability of floods.

Embankments or river-walls of gigantic strength are things not unheard of on the banks of the Thames. To suggest therefore a river-wall standing some 25 ft. out of the water when at its lowest, need not excite surprise. The wall, however, must be strong enough to resist the pressure of the water as it mounts to the summit, and must be independent of any backing of earth for at least the last fourth of its height. For behind this portion it is proposed to make an extensive reservoir, to be filled by the tide every time it rises. The tide is to pour into this reservoir through flood-gates so constructed as to allow of ingress only. A second reservoir of equal size with the first, but occupying the lowest fourth of the tide's height, is to be constructed to receive the impounded water from the upper reservoir, and to return it to the river (when the tide is down) by flood-gates allowing of egress only. The scheme thus includes two reservoirs, one emptying into the other, with a clear fall between the two of half the tide's height. It will no doubt be easy to regulate the flow, so as to cause equal quantities of water to pass down in equal times, and to spread the whole over the time which elapses between one tide and another. And, what is of greatest importance, the water in falling may be made to turn any number of wheels (breast wheels or overshot) that may be deemed sufficient. Now by this method, we utilise only one eighth of the tide's force for any given area; for we gather into the upper reservoir only one fourth of the bulk of water raised, and we make use of it only during its descent. But it can be proved by experiment to be the least costly method that can be adopted in order to produce a given result, especially where land is cheap, as in the quarters of Kent and Essex adjacent to the Thames. Nor is the result a mean one if properly regarded. D. B.

UTILISATION OF SLAG.

AN important process for the utilisation of slag has (according to the *Mining Journal*) recently been introduced on the Continent. The slag is reduced to a fine state of division, in which it becomes capable of a great variety of uses in addition to those for which it was originally supposed to be adapted. The channel through which the molten slag flows from the furnace is made, in this arrangement, to terminate in a running stream of water leading into a pit or excavation. On striking the water the lava stream of slag is blown and broken into a sort of fine porous gravel, which the flow of the water then bears along into the pit. Meanwhile the iron grains contained in the slag, which previously were separated by crushing, are now sorted out by this water process, sinking to the bottom by their weight instead of being carried on with the rest. The slag sand accumulating to the pit is charged thence into wagons or railway cars by means of an endless chain and buckets driven by an engine run by hot gases from the furnace. Thus treated the artificial sand or granulated slag is said to be not merely easier and cheaper to get rid of, but applicable to a number of valuable uses. One of these is for casting sand, pigs made in such a bed coming

out exceedingly bright. For this purpose the material is now very largely used in some parts of France, Belgium, and Prussia. The next step was a natural outgrowth of the last—to use the finer portions, separated by sifting, to sand the moulds for fine castings; thus employed, it is found cleaner and better than common sand, and the castings are improved. Another use to which this artificial or metallic gravel is put is that for ballasting railroad tracks, for which it is very serviceable. Being also very porous, packing well, and holding but little wet, this slag-sand forms a valuable concrete-like mortar, and not only this, but is capable of being used for cement. This is regarded, in fact, as its most important speciality, it being found that first-class cement can be thus obtained from almost any slag at a very small cost. Other uses for this substance are likewise mentioned, such as employing it upon land for the lime and silica contained, manufacturing fire-brick, &c., and enamelled bricks of different colours may be manufactured cheaply from this hitherto waste material, and this being the case its industrial value, under the hand of wise improvement, is likely to be very great.

ST. PAUL'S, CHEAPSIDE, AND LUDGATE-HILL.

A NOBLE monument of church architecture, St. Paul's, stands yet in its integrity, as erected by Sir Christopher Wren, on a plot of 2 acres and over 6 perches, according to an ancient registration. The whole area was inclosed by William the Conqueror, A.D. 1087; and at that period contained St. Gregory's Chapel, which stood on the east end, St. Paul's Cross, a hall, chapter-house, and various buildings; assemblies and wardmotes having been held there, although then outside the City precincts, which were immediately adjacent,—the statute of Magna Charta having been signed and proclaimed there. Outside the boundary on the east side stood St. Paul's school, and on the north the chapter-house. The inclosure is a scalene triangle, obtunded at the point next Ludgate-hill, and streets with houses of business surround the whole precincts.

Sir Christopher Wren laid out a plan of streets diverging from the east end towards the Bank and to London Bridge, evidently intending the north side as a continuation in nearly a straight line of the main thoroughfare to the Bank.

The first church built in the reign of Ethelred was destroyed by fire anno 1087; again, in the reign of Stephen, another fire ruined the then existing structure; and, lastly, the Great Fire of London demolished the large and imposing Gothic church which had been built in 1562,—thus making way for the genius of Sir Christopher Wren to found the present cathedral, of which the first stone was laid January 21, 1675, and the portals opened for service, December 2, 1697. Soon after, the commissioners projected the plan for an enceinture of massive iron railings, with six pairs of gates and heavy stone battlements, against which Wren most anxiously protested. This was in the year 1718, when in the eighty-sixth year of his age and in the forty-ninth of his professional career. Notwithstanding which the present railing, or rather "ironical fortification," was erected, and the great architect dismissed!

Viewing the rich and elaborately finished cathedral from either of the north or south sides, any observer must be struck with the incongruity of a hideous and meandering fence, which mars the effect of the finest architecture. The street on the south side descends towards Cannon-street, and the battlement or parapet walls stand 8 ft. higher than the pavement, the railing of 8 ft. in height being superimposed! On the north side, on the contrary, the pavement and footway are on the proper level, and a range of about thirty houses, but not in a straight line, borders a footway varying in width from 6 ft. to 14 ft. The driftway on this side also varies, being barely 8 ft. wide opposite the grand portal and steps, and varying from 24 ft. to 18 ft., and even to 15 ft. in its continuation from Ludgate-hill to Cheapside.

Comparison with any of the grand Continental buildings or cathedrals, which stand upon open plateaux, unobstructed by Gothish rails or fences, will at once demonstrate how our valued and splendid metropolitan temple is defiled and degraded by its surroundings.

Now the way to redeem and rectify so palpable an error is easy, and is perfectly under the control of the dean and chapter, who have already evidenced a regard for public interests by opening out the west end, next Ludgate-hill. Along the north side there is ample space for a grand thoroughfare, at least 40 ft. wide (besides footways) throughout its whole extent. The railing should be removed from the north-west angle, as far as the grand portal and circular steps, and foot pavement laid next the church, guarded by granite pillars and iron chains, as on the west.

From the portal to Cheapside eastward, there is ample scope of ground to practicate a driftway, say of 25 ft. additional width, leaving the four majestic plane trees standing on an interval of a 3 ft. reserve, between the old and the projected new thoroughfare, — this would give dignity to St. Paul's, whilst it would confer great advantages upon the trade of London, and the whole migrating community.

In the portion of this proposed line of enlargement lying west of the portal and steps there is no tombstone nor other intervention; but on the portion extending from the entrance to Cheapside there are three cist tombs, and perhaps a dozen flat and worn-out (hardly legible) grave-stones, the remains whereof might be removed into a suitable mortuary vault, to be interned in some unoccupied portion of the churchyard, no longer used for the sepulture of deceased citizens.

The first object in opening the line of thoroughfare herein indicated would be to "make straight the way"; the second, to curtail the route by 140 yards, the distance between Cannon-street and Cheapside being of that extent, which would be saved by opening out the north side in a direct line from Ludgate-hill.

An object not to be contemned would be the advantage gained by shops and business houses along the line; and having consulted several, the projector of this plan, who previously had (through the *Builder*) given his suggestions for the opening out of the western end, so far as the statue of Queen Anne, can with confidence state the majority of the residential proprietors are favourable to these suggestions.

By opening out this, the greatest, most central and thronged thoroughfare of London, the traffic might be divided, all wagons and loaded vans being restricted to the old route on the south side, and the noise of *roulage* might be wholly averted by adopting the new wood pavement; thus quiet could be assured for the divine services of our grand cathedral, and a free drive, with additional footway on the church side, secured for the public. QUONDAM.

HASTINGS WATER SUPPLY.

SIR,—In your issue a fortnight since an article appeared touching upon the above, and after leaning to the opinions expressed by "fully qualified correspondents," doubted the "discretion" of my assertions, which were published in my last annual report to the Town Council. The opinions of several of the "fully qualified (?)" correspondents are palpably indicative of a very "mushroom" knowledge of the "water" subject as a whole; and, as regards my own assertions, they were based upon evidence, the result of several examinations of the water, during the past winter months. The samples were brought to me officially, direct from the springs and reservoirs, having been collected in the usual careful and orthodox manner. In each instance the water was clear and pure. I have, of course, heard many complaints, and seen many bad samples produced for my inspection, which were procured from private houses. The impurities were in each case attributable to dirty cisterns, or some removable cause. All our water is "soft" and "chalybeate," therefore hydrated sesquioxide of iron is soon deposited on exposure, even in a small cistern. For this reason, among others, I advocated a constant service of spring water obtainable from our present water-shed, which service would do away with the objectionable deposit. I should be sorry to see our present "soft water supply" exchanged for a hard water. I have no doubt that more elaborate filter-beds and covered reservoirs will destroy and prevent the growth of any living organisms which are so rapidly generated in warm weather, even in distilled and the purest hard water. At all events, the public may rest assured that everything is being done by the Town Council to provide for the increasing demands of the borough.

CHAS. ASHENDEN,
Medical Officer of Health and
Public Analyst for the Borough of Hastings.

THE CONSTRUCTION OF THE BALL-ROOM IN FRONT OF GUILDHALL FOR THE PRINCE OF WALES FESTIVITIES.

DURING the last week or ten days upwards of 200 workmen have been actively employed in the construction of the new ball-room on the open area in front of Guildhall, for the festivities which are to be held on Friday next, the 19th inst., to celebrate the Prince of Wales's return from India. The structure is being erected, and entirely completed, including the interior decorations, by Messrs. Simmonds Brothers, of Newton-street, Holborn. The ground-floor portion of the structure embraces the whole of the area in front of Guildhall, and extends southwards along King-street, to the north side of Gresham-street, where is the main entrance. It is nearly 20 ft. in height, and strong logs of timber, formed into columns, support the ball-room floor above. The ball-room is 150 ft. in length, by 60 ft. in width, independently of two side wings, that on the south-east side overhanging Guildhall-buildings, and that on the south-west side extending in the direction of the adjoining churchyard. These wings are 40 ft. by 30 ft. The central portion of the ball-room has a clear span of 40 ft., with corridors on either side, 10 ft. in width. The latter are covered in by a lean-to roof on each side, whilst the central portion has a lofty clear-story. The ground-floor contains the crush-room and reception-room, and four staircases, 6 ft. in width, lead from the reception-room to the ball-room above. The elevation of the main entrance facing King-street, is castellated, and will be painted and decorated, as well as the whole of the interior, the walls of the reception-room and ball-room being ornamented with large mirrors. The structure is being erected under the direction of the City Architect.

RAILWAY BRIDGE, STEPNEY.

ENGINEERING operations of a somewhat complex character have been carried on at the bridge which bears the Blackwall Extension Railway over the Commercial-road at Stepney. These operations consist in the removal piecemeal of the old iron girder bridge and the substitution, piece by piece, of a new one without interfering with the railway traffic, which at that point is of a very heavy character. The construction of the new bridge will enable one footway of the Commercial-road to be widened about 18 in., the new abutment having been set back to that extent, and the old one cut away to line with it. The bridge is on the skew, and the main girders will not both be the same length; one will be 137 ft. and the other 135 ft. 3 in. long, and both 13 ft. 4 in. deep measured over the flanges and centre cover plates. The bridge will be 43 ft. wide, centre to centre, of main girders, and the cross-girders will be placed 8 ft. 8 in. apart and be carried on the bottom flanges of the main girders. Both main and cross girders are of the ordinary plate type. The rails will be carried on four strong wrought-iron rail-bearers, and near the main girders there will be platform-bearers, also of wrought iron. The contractors for the bridge are Messrs. A. Handyside & Co., of London and Derby, who designed the timber framing and its platform, the trestles having been arranged and placed in position by Mr. Langley, the engineer to the railway company. The work is under the control of Mr. E. Matheson, of the above-named firm, Mr. Norman Garrard being the contractors' engineer.

DANGER IN EARTHENWARE SYPHON TRAPS.

As any sanitary matter affecting the health of the community must be worthy of recording, may I be allowed to state that I have found several cases of glazed earthenware traps,—traps only in name, not in reality; for on close examination they did not dip sufficiently, and the foul gases had free escape. The public, and even our profession, take for granted that such things are made from a mould that is unerring. But I record my experience, as it involves serious results. ARTHUR LOADER.

Shaftesbury.—A discovery has been made here on the site of the ancient abbey of a stone cist or coffin having features and attributes of an interesting character.

PICTURE-MADNESS.

AT Christie's, on Saturday last, a picture 59½ in. by 45 in., called a portrait of Georgiana, Duchess of Devonshire, by Gainsborough, was sold for 10,605*l.*, the largest sum ever given for a picture in those rooms. In 1839 this same picture was bought by a Mrs. Magennis for 50*l.*, and was sold by her to Mr. Wynn-Ellis for 65*l.* The oddest part of the incident is that some qualified persons deny that it is the work of Gainsborough at all. At the same sale a picture called the Temple of Jupiter in Egina, by J. M. W. Turner, was sold for 2,100*l.*, though some very good judges maintain stoutly that Turner was not the painter of it; and even those who believe in the correctness of the ascribed authorship admit that it is a poor example of the master.

WORCESTER GUILDHALL.

SIR GILBERT SCOTT, R.A., has reported strongly recommending the maintenance of the present Guildhall, and says all the municipal requirements may be met by additions at a moderate cost. Sir Gilbert says the building "is a genuine specimen of a style which has done special credit to the English school of architecture, which owed its development in a high degree to our distinguished architect, Sir Christopher Wren, and which is at the present moment honoured and cultivated by a large class of our best architects under the name of the style of 'Queen Anne.'" He considers that the building has very high merits of its own, independently of its history or its style, and says he has rarely passed by it without being struck by its dignified and almost august aspect, and without being strongly impressed with its incalculable superiority to the majority of buildings of our own day. Mr. Waterhouse, the architect specially consulted by the Council, in his Report, strongly recommends the preservation of the front, as "a very interesting piece of work of our forefathers."

THE PRIZES AT THE BELFAST ARCHITECTURAL ASSOCIATION.

AT the closing meeting and *conversazione* of this Association, the Mayor in the chair, Mr. Robert M. Young, hon. secretary, read the report of the committee.

The report of the examiners was then read, and in it the prizes were awarded as follows:—

No. 1 Class—Two First Prizes—Thomas Duff, T. M. C. Johnstone.
No. 2 Class—1st prize, J. J. Phillips; 2nd prize, James M'Cammond.
No. 3 Class—1st prize, J. J. Phillips; 2nd prize, F. W. Lockwood.
No. 4 Class—Prize, J. M'Donnell.
No. 5 Class—1st prize, W. J. Gilliland.
No. 6 Class—1st prize, W. J. Gilliland; 2nd prize, T. M. C. Johnstone.
No. 7 Class—Prize, Mr. Alexander Anderson.
No. 8 Class—Prize, T. M. C. Johnstone.
The Vere Foster Prizes—1st prize, T. M. C. Johnstone; 2nd prize, E. Braddell; 3rd prize, E. F. D. Clarke.

Mr. Samuel P. Close moved, and Mr. Mackenzie seconded, the adoption of the reports.

Mr. Lockwood moved as an amendment that the adjudication in Classes 1, 3, and 5 be allowed to stand over until the committee could have a consultation with the eminent men who kindly acted as judges on the occasion.

Mr. Gilliland seconded the amendment.

The amendment, on being put to the house, was lost, and the reports were adopted.

The Mayor then distributed the prizes, and when he was doing so a large portion of the assemblage either applauded or hissed the successful competitors as they came forward.

Mr. Lockwood declined to receive his prize, as, he said, it did not justly belong to him.

On the motion of Mr. Watt, seconded by Mr. Vinnycombe, and supported by Mr. Lockwood, a vote of thanks was passed amid applause to Mr. Turner, Mr. Lynn, and Dr. Moore, who had kindly acted as judges. What does it all mean?

The Shakspeare Memorial.—At the annual meeting of the Stratford-on-Avon Shakspeare Club on the 25th ult. it was announced that Mr. Charles Flower, chairman of the Memorial Association, in addition to his previous handsome donation, has just given 100*l.* in furtherance of the memorial project. It is understood that the erection of the structure will be commenced when the design is settled.

A BRAVE WORKMAN.

WE have much pleasure in recording an act of courageous self-control and presence of mind which may be compared with advantage to the honours won by deeds of daring on the field of battle. Two workmen were engaged fixing a lightning conductor on the summit of the steeple at Ville-sur-Ourthe, in Belgium. To accomplish this somewhat difficult and delicate task it was necessary that one of the workmen should stand on the shoulders of his companion. While in this position, a violent gust of wind made him spill some molten lead, which fell on the hand and forearm of his friend. Notwithstanding the sudden intensity of the pain thus inflicted, the victim of this accident had the courage to remain motionless while the lead burnt its way into his flesh. He knew that the slightest movement might suffice to precipitate his companion from a height of 70 ft. into the street below, and he bravely endured the pain rather than imperil the life of his fellow-worker. M. A. Karis, slater, at Anthisne, is the hero of this brave deed, and his name is worthy of public record.

THE CHARGES OF THE NEW RIVER COMPANY.

MAJOR WIELAND, the owner of very extensive premises in Queen Victoria-street, was summoned by the Commissioners of Sewers, at Guildhall, before Alderman Carter and Sir F. Wyatt Truscott, for having on his premises a well for domestic purposes, which was impure and totally unfit for such purposes.

Mr. Baylis, for the Commissioners of Sewers, said that Major Wieland was the owner of very extensive premises in Queen Victoria-street, and had sunk a well to supply them with water. That water had been analysed by Dr. Saunders, and it was found to be entirely unfit for domestic purposes. Major Wieland had applied to him for a postponement of the summons, on the ground that he was anxious to have the water analysed on his own behalf, and Mr. Baylis thought the request so reasonable that he could not resist it.

Major Wieland said that he formerly had water from the New River Company, but their charge for it was tremendous. On two houses they charged him 40*l.* a year each, and on another 82*l.* a year. From the construction of the building very little water was required for domestic and drinking purposes. He had, therefore, endeavoured to supply his premises with water independently of the company.

Alderman Carter said he was glad to hear it; the price the New River Company charged for water was outrageous.

Major Wieland said he had sunk a well, and put up a small steam-engine at an expense of 400*l.*, and had placed up a large filter, with all the modern improvements, for the water to be drunk. If that were not sufficient, he would adopt any suggestion Dr. Sedgwick Saunders might make, and would use any filter he might recommend. If he were compelled to use the water of the New River Company, it would make a difference to him of 1,000*l.* a year.

Alderman Carter said that he sincerely hoped he would not be compelled to do that. The charges of the New River Company, he repeated, were unbearable. Major Wieland has since found that the water is too impure for use.

MIDDLESBROUGH WORKHOUSE COMPETITION.

AT the last meeting of Middlesbrough Board of Guardians the chairman explained the circumstances under which the Board were placed with regard to the new workhouse question. As they would be aware, specifications were issued of what the Local Government Board advised them would be required for the workhouse, and they advertised for plans for the same. Prizes were offered,—one of 100*l.* as a first; another of 50*l.*, as a second,—with the stipulation that every set of plans sent in should be accompanied with the estimate of some respectable firm, who would undertake to carry out the erection of the building, according to the specifications, to the Board's satisfaction. A building committee was appointed, the plans were carefully gone through, and it was decided to call in a professional man (Mr. T. Roger Smith, of London) to assist them in selecting the best set of plans. The report had been received, and the committee, on the motion of Mr. Gilkes, seconded by Mr. W. Bulmer, decided in favour of the plan marked "Alpha," for the first prize, and that entitled "Economy" for the second. The letters bearing the above mottoes were opened, and the design "Alpha" was found to have been submitted by Messrs. Perkin & Sons, architects, of East Parade, Leeds. The other letter was from Mr. Frederick Augustus Dovey, of 4, Kingston Parade, London, and of Manchester. The committee recommended the confirmation of these proceedings by the Board, that Mr. Roger Smith be written to and thanked for his assistance, and that the public be allowed to see the designs at the Workmen's Hall, during the afternoons of one week, from Friday, the 5th inst. Mr. Whitwell then moved the adoption of the minutes of the building committee. Mr. Moses seconded the motion, and it was carried.

The contractor's estimate on Messrs. Perkin's plan for carrying out the work was 28,450*l.*

The plans are to be laid before the Local Government Board at once.

COMPETITIONS.

New Church at Esclusham, near Wrexham.—Twenty-three sets of drawings were submitted under motto in the above competition from London, provincial, and local architects. The committee came to a decision on the 4th inst., when the plans of Mr. J. E. Lash, of Caxton Buildings, Wrexham, were selected, and the work will probably be commenced immediately. The building is cruciform on plan, having nave, chancel, north and south transepts, organ-chamber, and vestry, with heating apparatus under the latter. The principal entrance is at the west end. The seats are arranged to accommodate 350 worshippers. The style is the Geometrical.*

Rugeley Town-hall and Market.—At the monthly meeting of the Rugeley Local Board on the 2nd inst., considerable time was occupied in further examining the plans of the new hall and buildings, and the opinion of the meeting was taken upon each plan separately, which eventually reduced the number from 9 to 3,—viz., "Omega," by Mr. W. A. Bonney, of Rugeley; "Forward," by Mr. Foulks, of Birmingham; "Experientia Docet," by Mr. Dodd, of Reading. The meeting then further discussed the three plans, and concurred generally in selecting "Forward" as the most meritorious, subject to the same not exceeding the sum named (6,500*l.*), to include the clock tower, but the meeting postponed their final decision to a future meeting.

ARCHITECTS' RIGHT TO RETAIN DRAWINGS.

IN the case of Holmes *v.* Haig, in the Glasgow Sheriffs' Court, the plaintiff, a builder, sued Mr. Haig, architect, to recover the working drawings and calculations for the erection of a block of houses erected by the plaintiff, and for which defendant had been paid. Mr. Haig pleaded the custom of trade that an architect should retain his drawings, and some evidence was given. The sheriff found that the custom of trade had not been proved, and ordered the instant delivery of drawings to the plaintiff.

The New Seamen and Marines' Orphan Home, Landport, Portsmouth.—This home was opened on the 20th ult. by H.R.H. the Duke of Edinburgh. The new building comprises commodious offices, with washing-house, ironing-room, &c., a drying-ground, leading to a play-ground, with a small garden. On the first-floor at the north end is the girls' school-room, of the same size as the dining-room below, with a class-room 24 ft. 9 in. by 15 ft. 3 in., sick dormitory, said to be well ventilated, 28 ft. by 22 ft., with nurses' room, bath-room, and lavatory. Another dormitory, 30 ft. by 22 ft.; another 40 ft. 6 in. by 15 ft. 3 in.; another to the south, 60 ft. by 22 ft., with matron's rooms attached, clothes-closets, and well-supplied bath-room, lavatories, &c. The upper-floor consists of nearly the same, except that a dormitory takes the place of the school-room below, and there is a convalescent dormitory over the class-room. The architect is Mr. Thomas Dashwood, of Ryde, and the builder was Mr. Ward. The cost has been about 8,000*l.*

* The authors of the designs with the mottoes, "Spe" and "Bonâ Fide," not having sent their names and addresses, their drawings could not be returned.

THE GENERAL UNION OF CARPENTERS AND JOINERS.

THE forty-eighth annual report of the General Union of Carpenters and Joiners has just been issued. In it the secretary remarks:—It is with thankfulness that I have to record that, with very few exceptions, the building trade is in a very prosperous condition,—scarcely a man with a strong arm and willing heart has had to complain of want of employment. According to figures given we have 146 lodges with an aggregate number of 10,885 members, or an addition of five lodges and 1,184 members since our last annual issue. Now, I cannot help thinking that upon no previous occasion in the history of our society has there been greater cause for congratulation. We have our superannuation benefit to provide for. We distribute our thousands and tens of thousands in relieving our sick and suffering members, and those of us who may have the misfortune of being out of work; any of our members who unfortunately, by fire or other cause, are deprived of their tools, are compensated to the full value of them out of our funds. Those of our unfortunate brethen who, in their journey through life, are, from accidents or other causes, prevented from following their trade for a livelihood, we solace by placing a sum of money at their disposal, which by careful management may give them one more start in life. And we bury our members and their deceased wives with respectability. Our total income from all sources reaches the sum of 23,000*l.* 19s. 0½d., but owing to the re-arrangement in the time of closing our accounts, it is extremely difficult to give the exact proportionate increased income: still it is very perceptible that the income of the society is considerably above the ratio of previous years. The total expenditure of the society during the same period is 16,099*l.* 4s. 1½d. We have expended 1,251*l.* 9s. in endeavouring to compensate those of our members who have been out of employment. In endeavouring to relieve those of our members whom ill-health has unfortunately prevented from following their employment, in superannuating those who from old age are placed in a similar position, and in obtaining the necessary certificates, &c., 5,642*l.* 19s. 6d. have been absorbed. To carry out the system of insurance for loss of tools, the total outlay only amounts to the very small sum of 462*l.* 3s. 11½d. The next outlay is that occasioned by strikes; under this head 374*l.* 0s. 3d. have been expended. 850*l.* have been paid to those of our members who have, from accidents or other equally melancholy causes, been rendered unable to follow their usual vocations. We have lost during the past seventeen months 121 members and 86 members' wives, and the total amount of our funds expended for this purpose is 1,604*l.* 2,995*l.* 11s. 7d. have been devoted to the payment of the different officers of the society, and 2,918*l.* 19s. 10d. for rents of meeting-rooms, printing, and other necessary expenses to carry on the effective working of the union. Owing to the comparative exemption from prolonged strikes or extremely heavy calls upon the resources of our society, the natural consequence is a large augmentation of our accumulated capital, which now reaches 16,501*l.* 14s. 9½d., being an addition of 6,985*l.* 18s. 2½d. since the last annual report was issued.

MASTERS AND MEN.

Altrincham.—The bricklayers of Altrincham have applied for an increase of wages, the bricklayers asking for an advance of 1d. per hour and their labourers for an advance of ½d. In May, 1873, a code of working rules was drawn up, signed by six employers and six operatives, providing against strikes, and for the submitting of all disputes to arbitration. Three months ago, notice of an advance was served in accordance with the rules; and the employers, after consideration, offered the bricklayers 8½d. per hour, a ½d. per hour of an advance, and the balance in six months, or in case they refused this, to submit the whole matter to arbitration. To the labourers they offered 6½d. per hour, an advance of ½d. on their present rate, which is the rate of wages paid in Manchester. Up to the present time no arrangement has been come to. About 100 men will be affected.——The brickmakers have recently had a reduction of two hours per day, and on the 1st of June they will receive an advance of 1s. 3d. per 1,000 for making.

Bridlington.—The masons employed at the Cemetery works are now on strike. They have been in receipt of 32s. a week of 55½ hours, and now demand 1s. a week advance, and a reduction of time to 49½ hours. The contractor (Mr. Brown) has, it is said, expressed his willingness to give the advanced wage, but declines to agree to the shortened time.

Halifax.—A meeting of the masons' labourers of Halifax has been held, to take into consideration the proposal of the masters. It was decided to accept nothing short of 24s. per week, which will be an increase of 2s. on the present wages.

Oxford.—The operative carpenters and joiners of Oxford lately made a demand of an extra penny per hour, and an intimation was given to the employers that a strike would be the result if it was not acceded to. The advance has been granted.

Woolwich.—The bricklayers, carpenters, and labourers employed in the building trades in the Woolwich district are out on strike. They demand a rise of wages from 8d. to 9d. an hour for bricklayers, carpenters, &c., and from 5d. to 6d. for the hodmen and other labourers, with the total abolition of piece-work. The masters have met together and offered an increase to 8½d. per hour for mechanics, and 5½d. for labourers, but decline to abolish piece-work. The workmen reject these terms, and state that they will listen to no proposal which does not place them on an equality in the matter of wages with the workmen of the London district. The master builders are taking steps to have joiners' work done in the country, where prices are lower, or on the Continent.——Mr. Balguy, the magistrate at Woolwich Police Court, was engaged for a considerable time on the 5th inst. in hearing a complaint preferred against two carpenters, named Fowraker and Simons, by Messrs. Kirk & Randall, for leaving work which they had contracted to complete. The defendants left their work, with a number of other men, omitting to finish certain work which they were performing under a written specification. The magistrate decided that they had broken their contract, and ordered them to pay 5*l.* damages and 19s. costs.

North Shields.—On the 1st inst. the stonemasons at North Shields struck work, they wanting extra wages, and to be paid for walking to jobs.

Walsall.—The notice given by the plasterers, carpenters, and bricklayers at Walsall for an advance of 1d. per hour in wages terminated on the 29th ult., by which time the plasterers had accepted an advance of ½d., making the rate of pay in their case 8d. per hour. The carpenters and bricklayers were at first offered an advance of ½d. per hour, to date from the 1st of May, and another ½d. on the 1st of January, and subsequently the second ½d. was offered for the 1st of October; but the modified offer was refused as decidedly as the original one had been, and the matter stood over. On the 1st inst. the carpenters met to consider the question, and resolved to remain out for the 1d., to raise their wages to 8d. per hour. The bricklayers also held a meeting, and appointed a deputation to wait upon the employers; and arrangements were come to whereby the men returned to work at once with an advance of ½d. per hour, another ½d. to be conceded on the 1st of September, when they also will be receiving 8d. per hour. The non-society carpenters have returned to work on the masters' terms,—namely, an advance of ½d. per hour, and another advance of ½d. in September next. This is expected to lead to the return of the union carpenters to work and the end of the dispute.

CASES UNDER THE EMPLOYERS AND WORKMEN ACT.

ON the 27th ult. a prosecution was instituted in connexion with a strike against piecework among the carpenters of Woolwich. Three of their number, named Richard Blundell, Peter Cowie, and Mark Chesterman, were summoned before Mr. Patteson, at Woolwich Police-court, under the Employers and Workmen Act, for neglecting their work without lawful excuse, whereby their employers, Messrs. Kirk & Randall, had suffered damages laid at 10*l.* Mr. Edwin Hughes, solicitor, appeared for the prosecution, and the defendants were represented by Mr. Oppenheim, barrister, instructed by Messrs. Shaen & Roscoe, solicitors to the Amalgamated Society.

Mr. Edwin Hughes, solicitor, appeared for the prosecution, and the defendants were represented by Mr. Oppenheim, barrister, instructed by Messrs. Shaen & Roscoe, solicitors to the Amalgamated Society. Mr. Hughes said that Messrs. Kirk & Randall were contractors, having several Board schools and other large works on hand. The defendants and other workmen had made certain contracts with the firm, but before they were complete the workmen absented themselves, and the firm were put to serious loss. The Act, however, limited the damages to 10*l.*, and the complainants now claimed that amount of the defendants. Evidence was given that the three defendants agreed to make certain window-sashes for 30*l.*, and received three weeks' wages, when they left their work on the night before Good Friday, and had not since returned. The work had since been at a standstill. Mr. Oppenheim, for the defence, contended that the carpenters were engaged by the hour, and liable to be dismissed without notice. They were, therefore, at liberty to leave when they pleased, and this supposed contract, which they did not sign, was in no way binding. Mr. Patteson dismissed the summons against Cowie and Chesterman, believing that they were working under Blundell's orders, but he was satisfied that Blundell had broken his contract, and ordered him to pay the damages claimed, 10*l.*

On the 28th ult., at the Greenwich Police Court, George Collins, a painter and paperhanger, appeared to a summons to show cause why an order should not be made upon him to pay a sum of 4*l.* to James Lavell, for discontinuing a contract entered into for work, and which he refused to return and finish.

Mr. Carttar attended in support of the summons, and having stated that the complainant is a licensed victualler, and that the unfinished work was the repapering and repairing of a room on an agreement for 9*l.*, of which 5*l.* had been paid, a question arose as to whether proceedings before a magistrate could legally be taken, Mr. Carttar contending that the complainant stood in the position of an employer, and defendant as an artificer.

Mr. Patteson ruled that the recently passed Act was only an extension of the provisions of the former Act by giving magistrates the power of hearing and determining disputes between employers and employed, where the compensation sought to be obtained did not exceed 10*l.* The provision in the old Act defined that there should be a relationship between the master and the workman, such as a master builder and a journeyman in branches of such trade. The matter in dispute between the parties in this case was purely the business of the County Court judge, and he should dismiss the summons.

The defendant said he had not refused to complete the work, but had been ordered off the premises. He then instructed a surveyor to estimate the value of what he had done, but the surveyor was not allowed to go into the room. It was his intention to take proceedings in the county court, making a claim, after deducting the money already paid, and as he had lost a day in attending to the summons he asked that an order should be made upon the complainant to pay him for the loss of time.

Mr. Patteson said he had no power to make such an order.

DETAINING TOOLS.

AT the Clerkenwell Police-court, on the 1st inst., John Wilkinson, a plasterer, was summoned for detaining two tubs, two bankers, one sarry, and two pails, the property of Joseph Purchall, also a plasterer. It was stated that the complainant purchased the tools in question in November, 1874. At that time he undertook the management of the plasterers' work for Mr. Wix, a builder, at some buildings in the Finsbury Park-road, and took the tools there. Complainant had the taking on, paying, and discharging of the men in his line, and amongst the rest of the men he, on the 27th of March, 1875, employed the defendant as a journeyman at 8½d. an hour, and he was so employed until the following August, when complainant discharged him. In the beginning of December last he lent defendant some tools, which were not returned, and upon complainant going to defendant upon some buildings where he was at work in the Blackstock-road he saw the tools he had lent defendant. Complainant said he wanted them. Defendant replied that he had not done with them yet, and then said complainant should not have them at all: hence the present summons.

For the defence it was submitted that in May, 1875, the complainant and defendant entered into a partnership in the work and the tools, and it was agreed defendant should pay complainant 30s. for his share of the tools, which he had done, paying 5s. per week for four weeks, and afterwards the balance, 10s., down; and in this he was corroborated by complainant's own book, which showed they had received the same amount of wages weekly. In cross-examination defendant said he had no agreement in writing of the partnership, or receipts for the money he had paid.

The Magistrate said there was no evidence of a partnership, and the defendant must give up the things at once, with 2s. costs, or pay their value, 23s.

THE STATE OF EUSTON SQUARE.

SIR,—Please give me a corner of your valuable paper to point out in what an extraordinary condition one of the gardens belonging to Euston-square is at the present time. I mean the garden on the left-hand side of the Euston-road, in going from King's-cross to Hampstead-road, and near to Gordon and Tavistock squares. I was somewhat amazed the other day, in passing by this place, to find in what a very untidy state it is, presenting more the appearance of a wilderness than anything else. This square is filled with heaps of gravel, rubbish, and I know not what besides. Here and there a broken garden-seat may be seen. It is a most strange thing how a place of this description can be allowed to exist in close proximity to so good a neighbourhood. It presents a very striking contrast to the square on the opposite side, which is kept in very good order. NATHANIEL WATERALL.

Proposed New Workhouse Laundry at Hackney.—At the last meeting of the Hackney Board of Guardians, Dr. Millar, in pursuance of notice, moved that Messrs. Lee & Smith be instructed to prepare without delay specifications for the construction of a laundry for the use of the infirmary according to plans already drawn. The motion was rejected by fourteen to five.

CONCRETE FACING.

SIR,—We note in your report of "Concrete as a Building Material," published April 15th, that you state "Mr. Cunningham (representing the Broomhall Tile Company) said that for two or three years past his firm had been supplying slabs for facing concrete made from the refuse of blast furnaces," instead of which it should read, "Mr. Cunningham (representing the Broomhall Tile Company) said that for years past his firm have been supplying red and white blocks for facing concrete made of brick earth, the blocks doing away with the necessity of machines for raising the concrete, and that buildings erected with them may be seen at Mortlake and elsewhere."

For the Company,—C. S. G.

CHURCH-BUILDING NEWS.

Haslingfield.—The parish church of Haslingfield, Cambridgeshire, was re-opened for service on the 18th ult., after partial restoration under the superintendence of Mr. W. M. Fawcett, architect, Cambridge. The work of restoration so far has been chiefly confined to the chancel, the roof of which has been thoroughly repaired. There is a new east window, and the gable wall, which was in a dangerous state, has been rebuilt. The outer face of each wall has been renewed, and the inner surface re-plastered. The floor has been raised and re-formed. The windows have been filled with stained glass. The vicar (the Rev. G. C. Clements) has with his own hands executed the colouring of the roof, and the gilding, &c., on the altar and reredos. The colouring on the roof is designed with crosses on the different panels over the sanctuary, forming one larger one with the Agnus Dei in the centre. The remainder is filled up with the quaint designs of the clog almanack. The organ-chamber is entirely new. The roofs of the aisles have been thoroughly repaired, and the curious tracery-work in the spandrels is carefully preserved. The nave roof is new. The whole of the interior face of the walls has been made good and re-plastered, the floor re-laid, and some of the seating re-fitted, chairs making up the deficiency. The pulpit, more than 400 years old, has been preserved, and the font-cover, of Jacobean work, has been coloured by the vicar and re-hung. Much remains to be done.

Stuntney.—Stuntney Church, in the Isle of Ely, was re-opened on Easter Tuesday, after partial rebuilding. With the exception of the chancel, indeed, the whole of the church has been rebuilt, and is more than double the size of the old building, which had become thoroughly dilapidated and quite inadequate for the congregation. The old church contained some interesting specimens of Norman work, which have been preserved and reintroduced in the new structure. Mr. R. R. Rowe, of Cambridge, is the architect.

Marston Meysey.—The new church at Marston Meysey was consecrated on the 19th ult. The church that has been displaced to make room for the new structure, and to supply materials for it, was not a very old building, having been erected 228 years ago. Mr. Harrison, architect, who examined the church in 1844, stated that two principal causes of the ruined state of the walls appeared to be the paucity of the mortar used at its erection and the unseasoned condition of the oak timber of the roof, which had sagged under the weight of the stone tiles, and thrust out the walls, which had also settled in every direction. A plan was prepared by Mr. Harrison in 1845 for the rebuilding of the church, but nothing came of it. Two buttresses on the north side and a porch on the south have preserved the building from actual collapse, but it has long been in a very discreditable condition. About two years ago the present vicar, the Rev. W. H. Ranken, determined to make an effort to raise the amount of money requisite for a new church, and applied to Mr. James Brooks to supply a design for a new building. Mr. Brooks's design has now been carried into effect. The building consists of a nave, with south door, chancel, and small vestry, the style being Early English. A prominent feature of the church is the stone-groined roof in the chancel. In the east wall are three lancet windows. There are also lancet windows in the north and south walls, and in the west wall there is a window of somewhat greater width, above which is a circular window. The chancel is separated from the nave by a dwarf screen of Bath stone and red Mansfield, of which material the pulpit is also composed. The font is of yellow and red Mansfield, with a base of Painswick stone, above which is a piece of Forest of Dean. The walls of the church show rock-faced stone instead of being plastered. The nave is intended to seat 104 persons, and ten can sit in the chancel. The builder is Mr. Charles Brown, of Tetbury.

Fridaybridge.—In the offertory at Friday-bridge Church, in the Isle of Ely, on Easter Sunday, there was included a carved oak fald-stool, or Litany desk, worked from a design by Mr. W. Smith, architect, London, intended to replace a provisional one of stained deal on the step leading from the nave into the chancel. It was given by a resident. A lady and gentleman, residents, intend to present carved oak sedilia for the south side of the sanctuary, within the altar rails, to replace the bonded triplet of rush-bottomed chairs that has hitherto done service there.

Sandhurst.—The parish church of Sandhurst was re-opened on the 20th ult., after restoration. The Church had suffered so much from dilapidation and neglect that a large outlay was necessary. A great part of the chancel and the north porch have been entirely rebuilt, a parapet has been added to the north and south aisles, nearly the whole of the windows have been restored and re-glazed, two piers have been replaced, and the remaining piers made perfect. The belfry has been thrown open to the church, and open seats have been substituted for the old-fashioned pews. The floors have been laid with Godwin's tiles, and a heating apparatus has been fixed. The whole of the works have been carried out under the direction of Mr. R. Herbert Carpenter, architect.

Sevenoaks.—At a meeting held at Sevenoaks on the 22nd ult., it was resolved to appoint a committee to consider the question of the restoration of the parish church of St. Nicholas, and also to increase the present inadequate church-accommodation of St. John's district, with power to obtain estimates of the cost of carrying out those objects, and to report to a general meeting. The committee have decided upon calling in to their assistance Mr. Ewan Christian.

SCHOOL BOARD SCHOOLS.

Stainforth.—New Board schools at Stainforth, near Thorne, were opened on the 10th ult. The schools are on the east side of the road leading to Thorne, and are built of red bricks with stone dressings. They consist of mixed school, infants' school, board-room, class-room, cloak-room, lavatory, &c. The master's residence is at the east end of the building. The rooms are well lighted and lofty. The mixed school is fitted with patent desks and seats, which may be made into tables, &c., if required; the infants' school has a gallery. There are three playgrounds,—boys', girls', and infants',—the last a covered one. Mr. Enoch Meggitt, of Thorne, builder, was the contractor for the whole of the work, which was completed from the designs of Mr. J. Smith, of Hatfield.

Brighton.—At a recent meeting of the Brighton School Board, the common seal of the Board was affixed to the contract with Mr. G. R. Lockyer for the erection of the Boyce's-street Infants' School, and for other works in connexion with the Middle-street School; and it was resolved to apply to the Education Department for permission to borrow 3,000*l.* on account of the works, viz., 2,550*l.* for cost of buildings and fittings (amount of tender), 200*l.* for architect's commission and expenses of superintendence, and 250*l.* for contingent expenses; and Mr. Ransom, clerk of the works at the Pelham-street School, was engaged at an additional salary to superintend the building of the Infants' School in Boyce's-street.

Cockermouth.—A new Board school was opened at Cockermouth on the 8th ult. The building has been erected from designs (selected in competition) prepared by Mr. Spaull, of Shrewsbury. The cost has been 1,535*l.* The tenders accepted by the Board were those of Mr. Thomas Swinburn for building and slating, 1,050*l.*; Mr. P. Robinson, for wood work, 345*l.*; Mr. Henry Fisher, for ironmongery, glazing, &c., 115*l.*; and Mr. Joseph Waller for plastering, 25*l.*; making a total of 1,535*l.*, which, with the cost of the land, amounted to 1,668*l.*

Duthil, N.B.—The School Board of Duthil and Rothiemurchus opened two new schools on the 12th ult., one at Duthil and the other at Deshar. The two buildings contain exactly the same accommodation, and are similar in arrangement. The accommodation consists of a schoolroom, 45 ft. long by 22 ft. wide; a class-room, 20 ft. by 16 ft., seated to accommodate together 120 children. The rooms are well lighted, and are warmed and ventilated by Manchester grates. The seating is on the dual system. The accommodation of the teachers' houses consists of parlour, kitchen, scullery, pantry, three bedrooms, closet, and outhouses. Mr. Mackenzie, of Elgin, was architect of both schools. The contractors for the Deshar School were:—Mason, Wm. Grant, Grantown; carpenter, Chas. Ross, Grantown; slater, D. Cattanach, Newtonmore; plasterer, W. Duffus, Grantown; plumbers, Hunter & Wink, Nairn. For the Duthil School:—Mason, John Clark, Grantown; carpenter, D. Fraser, Carr Bridge; slater, J. Winchester, Grantown; plasterer, G. Grant, Grantown; plumbers, Hunter & Wink, Nairn. The cost of the Duthil School was 1,059*l.*, and that of the Deshar school, 1,012*l.*

Books Received.

Art-foliage for Sculpture and Decoration. 2nd Series. By J. K. COLLING. London: 150, Hampstead-road.

WE have received Part I. of a second series of Mr. J. K. Colling's illustrative work on "Art-foliage," which is, in fact, a new book. The work published under this title in 1865 made a success, and was soon sold off, and it has been thought better, instead of producing a second edition, to publish a new work with the same scope, but with new illustrations, having specially for their object the suggestion of foliage design, suitable for wood, stone, and terra-cotta. Part I., which is now published, deals chiefly with designs for wood-work, which are of a type slightly conventionalised, though hardly so much so as many, ourselves included, think desirable for architectural ornament. The feeling of the design is, in general, that of Late Decorated ornament. The drawings are very ably and clearly executed and lithographed, and the book in general very well got up. There are to be two more "Parts," each containing, like this one, twenty plates, and a fourth Part containing fourteen plates and descriptive letterpress of the whole, giving the natural sources whence the ornament is derived. We may take an opportunity of characterising the work more at length when it is before us in its complete form.

VARIORUM.

Engineering gives the following description of "A Steam Navvy":—"No small amount of curiosity has been excited in the district of Bellshill, near Motherwell, within the last few days by the arrival and operations of an American steam 'excavator,' now in good working order in a deep cutting, a little to the west of the village, on the new line of railway in course of construction for the North British Railway Company, by Mr. Young, railway contractor. The 'Navvy' is a powerful-looking machine, and employs only three men to work it,—an engineer, fireman, and craneman,—but other four men are needed to shift the wagons to and from the 'drop.' It is capable of filling a wagon in a minute, and does the labour of sixty hands. It is mounted on four wheels on iron rails at the mouth of the cutting, and from the jib of the crane a strong iron bucket is suspended by chains, to which four teeth are attached, projecting about a foot from the mouth of the bucket. The teeth tear up the face of the cutting, beginning at the bottom and filling the bucket."——A few words as to Fern Culture:—"There are few places where even the poorest cannot obtain ferns. Flowers that are cultivated,—and our garden-flowers require cultivation for their proper development,—are often beyond the reach of the poor: and no one brings the roots of wild-flowers into our towns. If they were brought hither, they would pine away, perhaps more quickly than our garden flowers; and they at least would not thrive any better in the absence of that one vitalising element,—sun. But ferns that grow in wild woods and open plains are in the free right of all who choose to gather them. They are gathered sometimes, and brought into our towns and cities by itinerant vendors; but you seldom see them in the dwellings of the poor. They, nevertheless, might be there. If there were a demand, the poor purveyors of the poor would soon bring a supply from the free, wild country where they grow; and there would be that demand if the poor knew more about these exquisite plants. Ferns will grow where flowering plants would perish. They require moisture and shade,—not stagnant, but percolating moisture. Place them where you will,—on the floor, on the table of a dimly-lighted room, in the sunless window-sill, in a shady corner,—anywhere,—and they will grow and develop, unrolling their charming fronds, and exhibiting their sweet feathery forms with all their natural grace, in the presence of squalor and misery."—*The Fern Paradise.* By Francis George Heath.

Miscellanea.

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The Guildhall Museum.—There has been lately placed in the Free Museum, Guildhall, a fine white marble fireplace, with carved wood at the top, of artistic workmanship. This was formerly in the old mansion in Lime-street where Sir Thomas Abney, knt., kept his mayoralty in 1700–1, originally the town residence of Sir John Scrope, fifth Baron Scrope, of Bolton, who died in 1498. Rebuilt by Richard Langton at the beginning of the seventeenth century. Presented by the Fishmongers' Company, 1875. A curious addition has been lately made to the collection of antiquities in this place, in the shape of a map of the world constructed by order of Prince Henry of Portugal, by Fra Mauro, of the Camaldolese Convent, Venice, A.D. 1459. This was presented to the Corporation by Baron Heath, F.R.S., F.S.A., Consul-General of Italy.

St. Peter's Working Men's Institute, Macclesfield.—This new building, situate in Windmill-street, Macclesfield, was opened on the 18th ult. It is a two-story edifice, built in brick, and is Gothic in style. It has a spacious entrance-hall; on the ground-floor are class-room, cloak-room, smoke-room, and boiler-house, in which are every requisite for supplying tea and coffee. The upper story consists of a spacious lecture-room, lofty and well lighted, approached by two flights of stairs, joining on the same landing, a staircase leading to the platform from the other end of the building. It is heated by Harlow's heating-apparatus. The cost will be about 900*l*., exclusive of the land and furniture, which is about 250*l*. more. The architect of the building is Mr. Jabez Wright, and the builders Messrs. Burrows & Moseley.

James Watt's Room at Heathfield.—The *Birmingham Post* states with great regret that the workshop of James Watt, at Heathfield Hall, has been dismantled, and that its contents are now, or will shortly be, removed to a distant home. Until within a very few days past this "classic garret" at Heathfield and its fittings have been carefully kept in the state in which they were left when the hand and eye of the master were last withdrawn from them, now nearly sixty years ago, and to-day the only accurate memorial which we have of them in that condition is a drawing of the interior of the room, which was made by the late Mr. W. C. Aitken, and which is in the possession of Mr. Samuel Timmins.

Burning of a Theatre at Rouen.—The Theatre of Arts, Rouen, was burnt through the stage curtain coming in contact with a gas jet. The fire speedily extended to all the friezes and scenes, a thick smoke enveloping the entire stage. The theatre was built in 1774, and was recently purchased by the municipality. Nothing is left of the structure but the façade and a portion of the principal staircase, and the loss is estimated at 2,000,000 francs.

Whitewash.—The following recipe for whitewash is recommended by the American Treasury Department to all lighthouse keepers, and is thought the best for all out-buildings of wood, brick, or stone:—Slake about one-half bushel unslaked lime with boiling water, keeping it covered during the process. Strain it, and add a peck of salt dissolved in warm water, three pounds of ground rice put into boiling water and boiled to a thin paste, one half-pound of powdered Spanish whiting, and one pound of clear glue dissolved in warm water; mix them well together, and let the mixture stand for several days. Keep the wash thus prepared in a kettle or portable furnace, and when used put it on as hot as possible, with either painter's or whitewash brushes.

Davenport's Patent Fasteners for Doors and Gates.—This is an ingenious little invention patented by Mr. M. Davenport, of 40, Wilson-street, Finsbury. It is an improved latch, and where fitted on gates or doors, a horseman passing through the former need not dismount, as he has only to pull the gate to with his hunting-whip and the catch fastens; or, a passenger in a railway or other carriage, or in an omnibus, has only to draw the door close and it is fastened. It closes upward, and is kept in position when closed by the weight of the handle. By raising the handle the latch opens, and by letting it go it is again closed. From its solidity and the absence of springs it is not liable to get out of order. It ought to come speedily into general use.

New Business Premises, Ludgate-hill.—The new premises on the south side of Ludgate-hill, belonging to Messrs. Samuel Brothers, have been opened. The structure is of seven stories, and each floor has an area of over 4,000 square feet. The shop and show-rooms occupy over 10,000 square feet on the ground, first, and second floors. The whole of the works in connexion with the adaptation of the premises to the requirements of Messrs. Samuel's business have been performed by Messrs. Browne & Robinson, builders, under the superintendence of Messrs. N. S. Joseph & Pearson, architects.

The Sanitary State of South Kensington Museum.—In the House of Commons, on the 5th inst., Lord Sandon, in reply to Mr. Torrens, admitted that the Art Library at South Kensington was in a crowded and unhealthy state. It was, however, a temporary room, and what improvements could be made had been made. The Educational Library, where the health of two attendants who had been removed to the Consumption Hospital had suffered, had now been transferred to another room. The general plan for completing South Kensington Museum had been agreed upon, and the first work to be undertaken would be the Art Educational Library.

Paintings at the Agricultural Hall, Islington.—A very curious series of paintings, illustrating the coronation of Charles X. of France, which took place in the Cathedral of Rheims on the 29th of May, 1825, are now set up for exhibition in the Agricultural Hall. The pictures are life-size, and the portraits, in many cases, remarkable. They differ considerably in degree of merit as works of art, but two or three of them are remarkable even in that respect. It appears that they were rolled up and put out of sight during troublous times, but that they should have got out of France seems odd, as they were probably national property.

Northern Counties Association of Medical Officers of Health.—At the spring quarterly meeting of this association, held at Hexham the other day, the president (Dr. Elliot, Carlisle), delivered an opening address, after which a paper on the drainage of mansions and houses of the upper classes was read by Dr. Fox; one on the compulsory registration of disease and deaths, by Dr. Maclagan; and one on the habitual breathing of a vitiated atmosphere as a predisposing cause of disease, by Dr. Jackson, Hexham. Discussions followed.

Edwards's Patent Self-acting Sash Fastening.—The arrangement of this fastener is very ingenious. It is unlocked by simply pressing a knob, the bolt is then held back by the catch on upper sash, allowing the window to be opened. The inventor claims as its advantages that it is self-acting, perfectly secure, and cannot possibly be opened from the outside, and we agree with him that it effectually tightens the sash, thereby preventing draught, admission of dust, and rattling of the window.

CONCRETE FACING.

Sir,—We note in your report of "Concrete as a Building Material," published April 15th, that you state "Mr. Cunningham (representing the Broomhall Tile Company) said that for two or three years past his firm had been supplying slabs for facing concrete made from the refuse of blast furnaces," instead of which it should read, "Mr. Cunningham (representing the Broomhall Tile Company) said that for years past his firm have been supplying red and white blocks for facing concrete made of brick earth, the blocks doing away with the necessity of machines for raising the concrete, and that buildings erected with them may be seen at Mortlake and elsewhere."

For the Company,—C. S. G.

CHURCH-BUILDING NEWS.

Haslingfield.—The parish church of Haslingfield, Cambridgeshire, was re-opened for service on the 18th ult., after partial restoration under the superintendence of Mr. W. M. Fawcett, architect, Cambridge. The work of restoration so far has been chiefly confined to the chancel, the roof of which has been thoroughly repaired. There is a new east window, and the gable wall, which was in a dangerous state, has been rebuilt. The outer face of each wall has been renewed, and the inner surface re-plastered. The floor has been raised and re-formed. The windows have been filled with stained glass. The vicar (the Rev. G. C. Clements) has with his own hands executed the colouring of the roof, and the gilding, &c., on the altar and reredos. The colouring on the roof is designed with crosses on the different panels over the sanctuary, forming one larger one with the Agnus Dei in the centre. The remainder is filled up with the quaint designs of the clog almanack. The organ-chamber is entirely new. The roofs of the aisles have been thoroughly repaired, and the curious tracery-work in the spandrels is carefully preserved. The nave roof is new. The whole of the interior face of the walls has been made good and re-plastered, the floor re-laid, and some of the seating re-fitted, chairs making up the deficiency. The pulpit, more than 400 years old, has been preserved, and the font-cover, of Jacobean work, has been coloured by the vicar and re-hung. Much remains to be done.

Stuntney.—Stuntney Church, in the Isle of Ely, was re-opened on Easter Tuesday, after partial rebuilding. With the exception of the chancel, indeed, the whole of the church has been rebuilt, and is more than double the size of the old building, which had become thoroughly dilapidated and quite inadequate for the congregation. The old church contained some interesting specimens of Norman work, which have been preserved and reintroduced in the new structure. Mr. R. R. Rowe, of Cambridge, is the architect.

Marston Meysey.—The new church at Marston Meysey was consecrated on the 19th ult. The church that has been displaced to make room for the new structure, and to supply materials for it, was not a very old building, having been erected 228 years ago. Mr. Harrison, architect, who examined the church in 1844, stated that two principal causes of the ruined state of the walls appeared to be the paucity of the mortar used at its erection and the unseasoned condition of the oak timber of the roof, which had sagged under the weight of the stone tiles, and thrust out the walls, which had also settled in every direction. A plan was prepared by Mr. Harrison in 1845 for the rebuilding of the church, but nothing came of it. Two buttresses on the north side and a porch on the south have preserved the building from actual collapse, but it has long been in a very discreditable condition. About two years ago the present vicar, the Rev. W. H. Ranken, determined to make an effort to raise the amount of money requisite for a new church, and applied to Mr. James Brooks to supply a design for a new building. Mr. Brooks's design has now been carried into effect. The building consists of a nave, with south door, chancel, and small vestry, the style being Early English. A prominent feature of the church is the stone-groined roof in the chancel. In the east wall are three lancet windows. There are also lancet windows in the north and south walls, and in the west wall there is a window of somewhat greater width, above which is a circular window. The chancel is separated from the nave by a dwarf screen of Bath stone and red Mansfield, of which material the pulpit is also composed. The font is of yellow and red Mansfield, with a base of Painswick stone, above which is a piece of Forest of Dean. The walls of the church show rock-faced stone instead of being plastered. The nave is intended to seat 104 persons, and ten can sit in the chancel. The builder is Mr. Charles Brown, of Tetbury.

Fridaybridge.—In the offertory at Friday-bridge Church, in the Isle of Ely, on Easter Sunday, there was included a carved oak faldstool, or Litany desk, worked from a design by Mr. W. Smith, architect, London, intended to replace a provisional one of stained deal on the step leading from the nave into the chancel. It was given by a resident. A lady and gentleman, residents, intend to present carved oak sedilia for the south side of the sanctuary, within the altar rails, to replace the bonded triplet of rush-bottomed chairs that has hitherto done service there.

Sandhurst.—The parish church of Sandhurst was re-opened on the 20th ult., after restoration. The Church had suffered so much from dilapidation and neglect that a large outlay was necessary. A great part of the chancel and the north porch have been entirely rebuilt, a parapet has been added to the north and south aisles, nearly the whole of the windows have been restored and re-glazed, two piers have been replaced, and the remaining piers made perfect. The belfry has been thrown open to the church, and open seats have been substituted for the old-fashioned pews. The floors have been laid with Godwin's tiles, and a heating apparatus has been fixed. The whole of the works have been carried out under the direction of Mr. R. Herbert Carpenter, architect.

Sevenoaks.—At a meeting held at Sevenoaks on the 22nd ult., it was resolved to appoint a committee to consider the question of the restoration of the parish church of St. Nicholas, and also to increase the present inadequate church-accommodation of St. John's district, with power to obtain estimates of the cost of carrying out those objects, and to report to a general meeting. The committee have decided upon calling in to their assistance Mr. Ewan Christian.

SCHOOL BOARD SCHOOLS.

Stainforth.—New Board schools at Stainforth, near Thorne, were opened on the 10th ult. The schools are on the east side of the road leading to Thorne, and are built of red bricks with stone dressings. They consist of mixed school, infants' school, board-room, class-room, cloak-room, lavatory, &c. The master's residence is at the east end of the building. The rooms are well lighted and lofty. The mixed school is fitted with patent desks and seats, which may be made into tables, &c., if required; the infants' school has a gallery. There are three playgrounds,—boys', girls', and infants',—the last a covered one. Mr. Enoch Meggitt, of Thorne, builder, was the contractor for the whole of the work, which was completed from the designs of Mr. J. Smith, of Hatfield.

Brighton.—At a recent meeting of the Brighton School Board, the common seal of the Board was affixed to the contract with Mr. G. R. Lockyer for the erection of the Boyce's-street Infants' School, and for other works in connexion with the Middle-street School; and it was resolved to apply to the Education Department for permission to borrow 3,000*l.* on account of the works, viz., 2,550*l.* for cost of buildings and fittings (amount of tender), 200*l.* for architect's commission and expenses of superintendence, and 250*l.* for contingent expenses; and Mr. Ransom, clerk of the works at the Pelham-street School, was engaged at an additional salary to superintend the building of the Infants' School in Boyce's-street.

Cockermouth.—A new Board school was opened at Cockermouth on the 8th ult. The building has been erected from designs (selected in competition) prepared by Mr. Spaull, of Shrewsbury. The cost has been 1,535*l.* The tenders accepted by the Board were those of Mr. Thomas Swinburn for building and slating, 1,050*l.*; Mr. P. Robinson, for wood work, 345*l.*; Mr. Henry Fisher, for ironmongery, glazing, &c., 115*l.*; and Mr. Joseph Waller for plastering, 25*l.*; making a total of 1,535*l.*, which, with the cost of the land, amounted to 1,668*l.*

Duthil, N.B.—The School Board of Duthil and Rothiemurchus opened two new schools on the 12th ult., one at Duthil and the other at Deshar. The two buildings contain exactly the same accommodation, and are similar in arrangement. The accommodation consists of a schoolroom, 45 ft. long by 22 ft. wide; a class-room, 20 ft. by 16 ft., seated to accommodate together 120 children. The rooms are well lighted, and are warmed and ventilated by Manchester grates. The seating is on the dual system. The accommodation of the teachers' houses consists of parlour, kitchen, scullery, pantry, three bedrooms, closet, and outhouses. Mr. Mackenzie, of Elgin, was architect of both schools. The contractors for the Deshar School were:—Mason, Wm. Grant, Grantown; carpenter, Chas. Ross, Grantown; slater, D. Cattanach, Newtonmore; plasterer, W. Duffus, Grantown; plumbers, Hunter & Wink, Nairn. For the Duthil School:—Mason, John Clark, Grantown; carpenter, D. Fraser, Carr Bridge; slater, J. Winchester, Grantown; plasterer, G. Grant, Grantown; plumbers, Hunter & Wink, Nairn. The cost of the Duthil School was 1,059*l.*, and that of the Deshar school, 1,012*l.*

Books Received.

Art-foliage for Sculpture and Decoration. 2nd Series. By J. K. Colling. London: 150, Hampstead-road.

We have received Part I. of a second series of Mr. J. K. Colling's illustrative work on "Art-foliage," which is, in fact, a new book. The work published under this title in 1865 made a success, and was soon sold off, and it has been thought better, instead of producing a second edition, to publish a new work with the same scope, but with new illustrations, having specially for their object the suggestion of foliage design, suitable for wood, stone, and terra-cotta. Part I., which is now published, deals chiefly with designs for wood-work, which are of a type slightly conventionalised, though hardly so much so as many, ourselves included, think desirable for architectural ornament. The feeling of the design is, in general, that of Late Decorated ornament. The drawings are very ably and clearly executed and lithographed, and the book in general very well got up. There are to be two more "Parts," each containing, like this one, twenty plates, and a fourth Part containing fourteen plates and descriptive letterpress of the whole, giving the natural sources whence the ornament is derived. We may take an opportunity of characterising the work more at length when it is before us in its complete form.

VARIORUM.

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Profitable Sewage Irrigation at Wolverhampton.—At the quarterly meeting of the Wolverhampton Town Council held on Monday last, the 8th inst., a report was submitted by the Sewerage Committee respecting the farming operations at the Barnhurst Estate, from which it appeared that though the past year generally has been unfavourable to successful farming, owing to the extraordinary and frequent falls of rain, the floods causing great damage to the grain crops, decreasing the yield and injuring the quality, yet the balance-sheet shows a profit on the year's working of 1,048*l*. 16*s*. 5*d*., equal to 84*s*. 7*d*. per acre on the 248 acres of land under cultivation, or an increase of 52 per cent. on last year's experience. In conclusion, the committee draw attention to the great damage sustained to crops through acids being allowed to run into the sewers from manufactories in the borough.

The Technical Education Movement.—Mr. Mundella's Bill for the promotion of technical education is not yet in type; but the *Scotsman* understands that it will embrace the following points:—(1) That the power of deciding upon the establishment of free libraries shall be vested in the local authorities; (2) that the rate for a free library pure and simple shall not exceed 1d. in the pound, but that if museums and technical instruction are added, the maximum may be 2d.; (3) that the second 1d. may be expended wholly on that particular kind of technical instruction which is best adapted for each neighbourhood. Mr. Mundella will also propose as a supplemental measure that assistance from the British Museum, the National Gallery, and other great national bodies shall be rendered to the local institutions throughout the country.

The Guildhall Museum.—There has been lately placed in the Free Museum, Guildhall, a fine white marble fireplace, with carved wood at the top, of artistic workmanship. This was formerly in the old mansion in Lime-street where Sir Thomas Abney, knt., kept his mayoralty in 1700-1, originally the town residence of Sir John Scrope, fifth Baron Scrope, of Bolton, who died in 1498. Rebuilt by Richard Langton at the beginning of the seventeenth century. Presented by the Fishmongers' Company, 1875. A curious addition has been lately made to the collection of antiquities in this place, in the shape of a map of the world constructed by order of Prince Henry of Portugal, by Fra Mauro, of the Camaldolese Convent, Venice, A.D. 1459. This was presented to the Corporation by Baron Heath, F.R.S., F.S.A., Consul-General of Italy.

St. Peter's Working Men's Institute, Macclesfield.—This new building, situate in Windmill-street, Macclesfield, was opened on the 18th ult. It is a two-story edifice, built in brick, and is Gothic in style. It has a spacious entrance-hall; on the ground-floor are class-room, cloak-room, smoke-room, and boiler-house, in which are every requisite for supplying tea and coffee. The upper story consists of a spacious lecture-room, lofty and well lighted, approached by two flights of stairs, joining on the same landing, a staircase leading to the platform from the other end of the building. It is heated by Harlow's heating-apparatus. The cost will be about 900*l*., exclusive of the land and furniture, which is about 250*l*. more. The architect of the building is Mr. Jabez Wright, and the builders Messrs. Burrows & Moseley.

James Watt's Room at Heathfield.—The *Birmingham Post* states with great regret that the workshop of James Watt, at Heathfield Hall, has been dismantled, and that its contents are now, or will shortly be, removed to a distant home. Until within a very few days past this "classic garret" at Heathfield and its fittings have been carefully kept in the state in which they were left when the hand and eye of the master were last withdrawn from them, now nearly sixty years ago, and to-day the only accurate memorial which we have of them in that condition is a drawing of the interior of the room, which was made by the late Mr. W. C. Aitken, and which is in the possession of Mr. Samuel Timmins.

Burning of a Theatre at Rouen.—The Theatre of Arts, Rouen, was burnt through the stage curtain coming in contact with a gas jet. The fire speedily extended to all the friezes and scenes, a thick smoke enveloping the entire stage. The theatre was built in 1774, and was recently purchased by the municipality. Nothing is left of the structure but the façade and a portion of the principal staircase, and the loss is estimated at 2,000,000 francs.

Whitewash.—The following recipe for whitewash is recommended by the American Treasury Department to all lighthouse keepers, and is thought the best for all out-buildings of wood, brick, or stone:—Slake about one-half bushel unslaked lime with boiling water, keeping it covered during the process. Strain it, and add a peck of salt dissolved in warm water, three pounds of ground rice put into boiling water and boiled to a thin paste, one half-pound of powdered Spanish whiting, and one pound of clear glue dissolved in warm water; mix them well together, and let the mixture stand for several days. Keep the wash thus prepared in a kettle or portable furnace, and when used put it on as hot as possible, with either painter's or whitewash brushes.

Davenport's Patent Fasteners for Doors and Gates.—This is an ingenious little invention patented by Mr. M. Davenport, of 40, Wilson-street, Finsbury. It is an improved latch, and where fitted on gates or doors, a horseman passing through the former need not dismount, as he has only to pull the gate to with his hunting-whip and the catch fastens; or, a passenger in a railway or other carriage, or in an omnibus, has only to draw the door close and it is fastened. It closes upward, and is kept in position when closed by the weight of the handle. By raising the handle the latch opens, and by letting it go it is again closed. From its solidity and the absence of springs it is not liable to get out of order. It ought to come speedily into general use.

New Business Premises, Ludgate-hill.—The new premises on the south side of Ludgate-hill, belonging to Messrs. Samuel Brothers, have been opened. The structure is of seven stories, and each floor has an area of over 4,000 square feet. The shop and show-rooms occupy over 10,000 square feet on the ground, first, and second floors. The whole of the works in connexion with the adaptation of the premises to the requirements of Messrs. Samuel's business have been performed by Messrs. Browne & Robinson, builders, under the superintendence of Messrs. N. S. Joseph & Pearson, architects.

The Sanitary State of South Kensington Museum.—In the House of Commons, on the 5th inst., Lord Sandon, in reply to Mr. Torrens, admitted that the Art Library at South Kensington was in a crowded and unhealthy state. It was, however, a temporary room, and what improvements could be made had been made. The Educational Library, where the health of two attendants who had been removed to the Consumption Hospital had suffered, had now been transferred to another room. The general plan for completing South Kensington Museum had been agreed upon, and the first work to be undertaken would be the Art Educational Library.

Paintings at the Agricultural Hall, Islington.—A very curious series of paintings, illustrating the coronation of Charles X. of France, which took place in the Cathedral of Rheims on the 29th of May, 1825, are now set up for exhibition in the Agricultural Hall. The pictures are life-size, and the portraits, in many cases, remarkable. They differ considerably in degree of merit as works of art, but two or three of them are remarkable even in that respect. It appears that they were rolled up and put out of sight during troublous times, but that they should have got out of France seems odd, as they were probably national property.

Northern Counties Association of Medical Officers of Health.—At the spring quarterly meeting of this association, held at Hexham the other day, the president (Dr. Elliot, Carlisle), delivered an opening address, after which a paper on the drainage of mansions and houses of the upper classes was read by Dr. Fox; one on the compulsory registration of disease and deaths, by Dr. Maclagan; and one on the habitual breathing of a vitiated atmosphere as a predisposing cause of disease, by Dr. Jackson, Hexham. Discussions followed.

Edwards's Patent Self-acting Sash Fastening.—The arrangement of this fastener is very ingenious. It is unlocked by simply pressing a knob, the bolt is then held back by the catch on upper sash, allowing the window to be opened. The inventor claims as its advantages that it is self-acting, perfectly secure, and cannot possibly be opened from the outside, and we agree with him that it effectually tightens the sash, thereby preventing draught, admission of dust, and rattling of the window.

Rendle's Patent System of Glazing.—We understand that this system of glazing, of which we have before spoken approvingly, was tested on the 2nd inst., by her Majesty's War Department, &c., under the direction of Lieut.-Col. Scratchley, R.E., inspector of works. A skylight, 12 ft. square, was inserted in the roof of a railway-shed, at the Royal Arsenal at Woolwich, and a heavy stream of water was poured on it from a hose attached to the fire-main. It stood this very severe test admirably, we are informed, no leakage whatever being observable.

Silwood Park, Sunninghill, Berks.—The foundation-stone of the new mansion, proposed to be erected on the site of the old one, for Mr. Charles P. Stewart, Lord of the Manor of Sunninghill, was laid by Mrs. Charles P. Stewart, on the 25th April last. The workmen were afterwards entertained at dinner at the One Tun Inn. The architect for the new building is Mr. A. Waterhouse. The works will be carried out by Mr. W. Hearn, of Bayswater, London. The clerk of works is Mr. Robert Leigh Corlett.

Shutters.—Messrs. Clark & Co., of Rathbone-place, who have made self-coiling, revolving shutters a speciality, have sent us a little trade-book which shows their construction and application. These shutters are very widely used. It also illustrates the "Lifta" made by Messrs. Clark & Co.

Association of Municipal and Sanitary Engineers and Surveyors.—Arrangements have been made for an inspection of the Manchester Corporation Reservoirs and Waterworks by the members of this Association, on Friday, the 19th of May.

The Road to Russia.—Messrs. Henry Head & Co., of Gracechurch-street, have been appointed agents in the United Kingdom to the Nadejda Transport Company of St. Petersburg and the principal towns of Russia, for the purposes of through traffic.

Loan Collection of Scientific Apparatus. The collection is a remarkable one, and will have attention. It will be visited by her Majesty the Queen on this, Saturday, the 13th, and opened to the public on Monday.

Architecture in the Paris Salon.—The Section of Architecture consists of only seventy-six frames.

TENDERS

For a dwelling-house on the Monks-road, Lincoln, for Mr. Fambrina. Messrs. Drury & Mortimer, architects. Quantities supplied:—

Pearson	£1,296 12 0
Oller & Elsey	1,069 12 0
Martin & Sims	1,069 0 0
Brooks	950 0 0
Taylor & Brown	949 0 0
Sharpe	893 0 0
Harrison	891 9 4
Kent	889 0 0
Goodbarne	875 0 0
Crosby & Sons	872 0 0
Cowen	779 0 0
Slingsby	739 0 0
Chambers (accepted)	729 10 0

For the erection of a parsonage-house at Bracebridge, Lincoln, for the Rev. C. C. Ellison. Messrs. Goddard & Son, architects. Quantities supplied:—

Knight	£1,349 0 0
Barnes & Wright	1,345 0 0
Hobson & Taylor	1,340 0 0
Martin & Sims	1,326 0 0
Brooks	1,325 0 0
Oller & Elsey (accepted)	1,239 0 0

For bar-fittings, &c., at the Black Prince, Walworth-road, for Mr. George Cox. Mr. John Viney, architect:—

Fittings.	
Taylor	£254 10 0
Pewtering.	
Heath	99 0 0
Embossing, &c.	
Gibbs	121 4 3

For alterations and additions to the Bull and Ram, Old-street, for Mr. F. Guyer. Mr. John Viney, architect:—

Beale	£1,198 0 0
Stamp & Bowtle	937 0 0
Anley	876 0 0
Eaton	750 0 0

For building two semi-detached houses, Brownswood Park, for Mr. J. Newton. Mr. J. Viney, architect:—

Sutton (accepted)	£1,850 0 0

For alterations to the George the Fourth, Old-street, for Mr. E. J. Butt. Mr. John Viney, architect:—

Lewis	230 0 0

For erection of house for Mr. J. Sully, Bromley, Kent. Messrs. Kittle & Ashdowne, architects:—

Emmett	£1,075 0 0
Payne & Balding	970 0 0
Copping	720 0 0

For congregational church, Romford. Mr. E. C. Allam, architect. Quantities by Messrs. Stones & Son:—

	Contract No. 1.	Contract No. 2. Spire.
Shurmur	£4,396	£549
Boyce	4,092	595
Manley & Rogers	3,880	475
Gregory	3,859	398
Staines & Son	3,687	446
Stoner	3,676	349
Blackmore	3,177	340
Niblett (total)	£4,500	

For alterations at the Mamby Arms, Water-lane, Stratford, for Mr. Kemp. Mr. Edward Brown, architect:—

Marr (accepted)	£460 0 0

For sundry alterations and additions to 140, Westminster Bridge-road, for the Lambeth Baths and Washhouses Company, Limited. Mr. S. C. McMurdie, architect:—

Downs & Company	£760 0 0
William Downs	727 0 0
Sharpington & Cole	700 0 0
Gammon & Son	700 0 0
Andrew	681 0 0
Cullum	679 0 0

For works at Wapping, for the Thames Steam Ferry Company, Limited. Mr. Alexander R. Stenning, architect:—

Lee & Sons (accepted)	£10,917 0 0

For alterations and additions to Manor Villa, Tonbridge Wells. Mr. Alexander R. Stenning, architect:—

Garnham (accepted)	£325 0 0

For alterations and additions to St. Stephens's Schools, Lewisham. Mr. Alexander R. Stenning, architect:—

Jerrard	£475 0 0
Sabey & Son (accepted)	430 0 0

For erecting hydraulic crane at St. Katherine's Wharf, for the General Steam Navigation Company (exclusive of mason's and builder's work. Mr. Alexander R. Stenning, architect:—

Moreland & Son	£777 0 0
Armstrong & Co. (accepted)	690 0 0

For alterations and additions to Oakwood, Redhill, Surrey, for Mr. Vincent Nicholl. Mr. Alexander R. Stenning, architect:—

Woodward (accepted).

For stable buildings and foundations of proposed villa residence at Addison-road, Kensington, for Mr. R. King Pierce. Mr. D. Aston, architect:—

Robert & E. Smith (accepted)	£970 0 0

For drainage works at the Camberwell Cemetery, Forest-hill:—

Harrison	£557 0 0
Groves	551 0 0
Minard	515 0 0
G. & S. Fisher	498 0 0
Weinwright	496 10 0
Johnston	495 0 0
Faulkner	495 0 0
Woodhams	455 0 0
Harris (accepted)	449 0 0

For painting and decorative works at The Harts, Woodford, for Mr. James Spicer, J. P. Mr. Rowland Plumbe, architect:—

Horne	£1,140 0 0
Wontner Smith	648 18 0
Wood	599 0 0
Pitman & Cuthbertson	598 0 0
Egan	595 0 0
Phillips & Son	474 5 0

For the erection of boys', girls', and infants' school-rooms, at Sandwich, Kent, for the U. D. School Board. Mr. John Greene Hall, architect:—

Matthews	£3,221 0 0
Lucas and Featherstone	2,745 0 0
Gaskin	2,740 0 0
W. & T. Denne	2,725 0 0
Naylar (accepted)	2,696 0 0

For two lodges at Bisley, Surrey, for the Committee of the Refuges for Homeless and Destitute Children. Messrs. E. Habershon & Brock, architects:—

Howe & White	£850 0 0
Stamp & Bowtle	847 0 0
Aitchison & Walker	800 0 0
Haynes	775 0 0
Brass	770 0 0

For the erection of residence at Market Harborough. Mr. Charles Bell, architect. Quantities by Mr. Henry Lovegrove:—

Patterson	£2,450 0 0
Clark	2,323 0 0
Hobson	2,290 0 0
Mattock	2,280 0 0
Palmer	2,235 0 0
Hall (accepted)	1,860 0 0

For additions to a warehouse, High Holborn. Mr. John Butler, architect. Quantities by Mr. Henry Lovegrove:—

Yardley	£1,800 0 0
Scrivener & White	1,654 0 0
Howard	1,587 0 0
Lathey, Brothers	1,575 0 0
Macey	1,519 0 0
Bishop & Hooper	1,379 0 0
Hoare & Son (accepted)	1,299 0 0

For the erection of school buildings and fences at Beckrow, for the Mildenhall School Board. Mr. H. Lovegrove, architect:—

	Schools.	Fences.
Ruse & Son (accepted)	£784	£132

For the erection of school buildings at Cross Bank, for the Mildenhall School Board. Mr. Henry Lovegrove, architect:—

	Schools.	Fences.
Ruse & Son (accepted)	£545	£132

(N.B. Provision of 58*l.* for concrete, &c. in tender.)

For the construction of buildings for the Llandrindod Wells Freehold Land and Building Company. Messrs. Powell, Bell, & Swettenham, architects:—

Morgan	£13,600 0 0
Williams & Son	12,434 0 0
Stephens & Bastow	9,240 0 0
Sholl & Jones	8,700 0 0

For House at Gosden Hill Farm, Send, Surrey, for the Earl of Onslow. Messrs. E. W. Lower & Son, Architects. Quantities supplied by Mr. H. Moon, jun.:—

Goddard & Sons	£2,328 0 0
Mitchell, Brothers	2,189 15 0
Nye	2,061 0 0
Pink	2,055 0 0
Colls & Sons	1,925 0 0
Whitburn (accepted)	1,880 0 0

For shop and residence for Mr. Ward, fish and ice merchant, Winchester. Mr. T. Micklam, architect. Quantities supplied:—

Macklin	£928 0 0
Ayling & Bell	874 0 0
Fielder	858 0 0
Beavis (accepted)	849 0 0
Redding & Abley (withdrawn)	772 10 0

For building a house at the corner of York-road and Simpson-street, Battersea, for Mr. R. Winders. Henry John Hansom, architect. Quantities by Mr. Henry Smith:—

Baker	£1,160 0 0
Lathey, Brothers	1,153 0 0
Gregory	1,147 0 0
Mallett	1,120 0 0
Smith	1,100 0 0
Beale	1,048 0 0
Appleton & Turtle	835 0 0
Parsons	795 0 0

For rebuilding cellars, &c., for Messrs. Daun & Valentin, London. Messrs. George & Peto, architects:—

Payne & Balding	£4,410 0 0
Ashby, Brothers	3,826 0 0
Manley & Rogers	3,717 0 0
Tongue	3,644 0 0
Perkins	3,393 0 0

For rebuilding Coach and Horses, Orpington, Kent, for Messrs. John Fox & Sons. Mr. G. H. Pierre Harris, architect:—

Tredwell	£1,070 0 0
Arnaud	996 0 0
Payne & Balding (accepted)	982 0 0

For new municipal buildings for the borough of Newbury:—

Crook (accepted)	£4,345 0 0

For Metropolitan Artisans' and Labourers' Dwellings, Battersea Park, blocks A and B. Mr. Charles Barry, architect. Quantities supplied by Messrs. Strudwick, Selby, & Rogers:—

Downs & Co., accepted.

In last week's impression, in the list of tenders for the new works and alterations at the German Hospital, Dalston, the lowest tender is written as from Carter 5,700*l.*, whereas it should have been Larter, 5,700*l.*

TO CORRESPONDENTS.

A Smoky Chimney.—A country rector says he is anxious to know a cheap and effective cure for a terribly bad smoky chimney at his parish school-house. (It can scarcely be necessary to tell him that such an annoyance can be remedied with certainty only by one who studies it on the spot.)

T. M.—L. & Son.—P. B. & S.—H. L.—E. S.—A. R.—H. J. H.—N. W.—A. L.—M. & Sons.—D. B.—C. W.—C. F. H.—W. L. & G. T.—Observer.—Mr. S.—R. E. P.—J. S. K.—H. W.—B. F.—G. M.—T. B. (shall hear).—A. S. (under our mark).—H. H. (next week).—J. T. B. (next week).—A pile of correspondence is unavoidably postponed.

We are compelled to decline pointing out books and giving addresses.

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

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